



WORKBOOKS



Science

Meets Common
Core standards

Makes learning
easy and fun

Builds and
boosts key skills

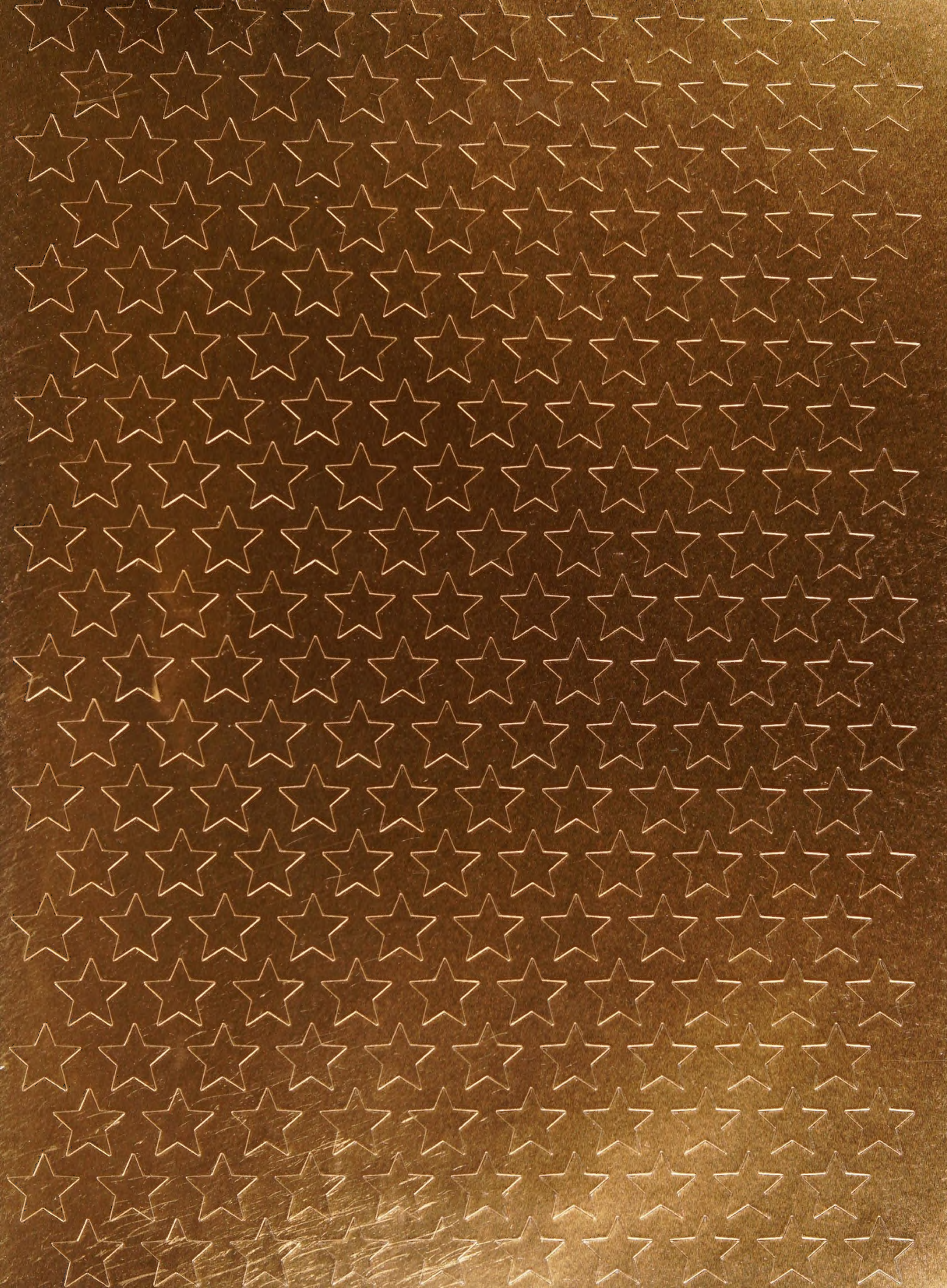


200
GOLD
REWARD
STARS

Science

Learn and Explore







WORKBOOKS



Science

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Educational Consultant Kara Pranikoff





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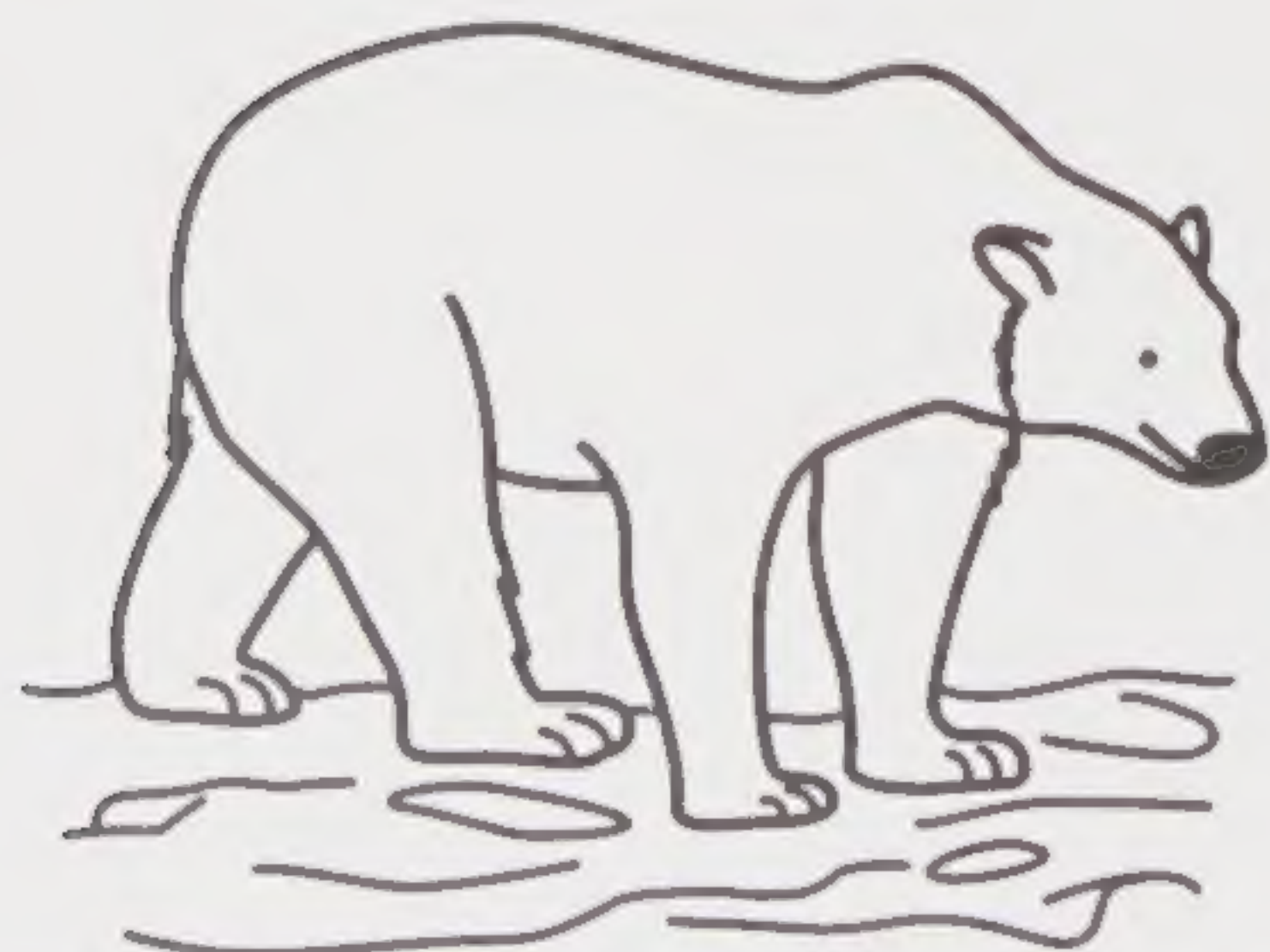
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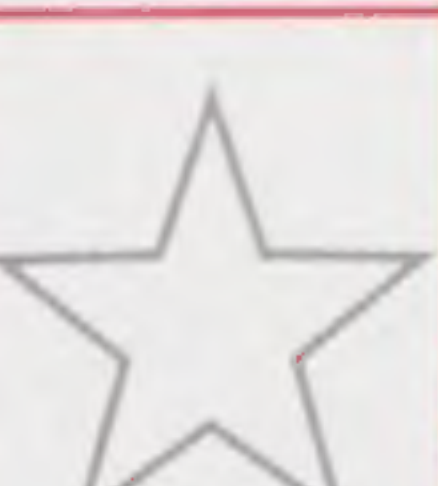


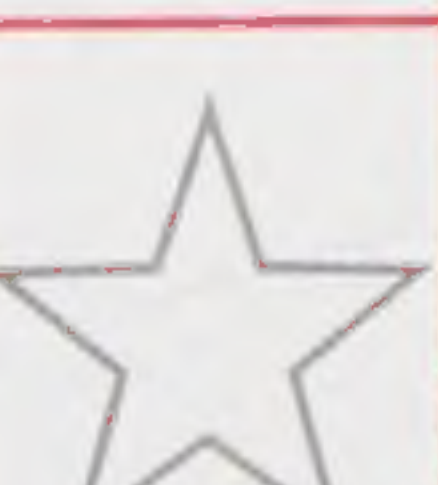

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Once you have completed each page,
stick a star in the correct box below.

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Scientists

FACTS

Scientists study different parts of nature and the universe.

Label the name of each scientist to complete the sentence.

Marine biologist

Meteorologist

Paleontologist



.....
studies the atmosphere.

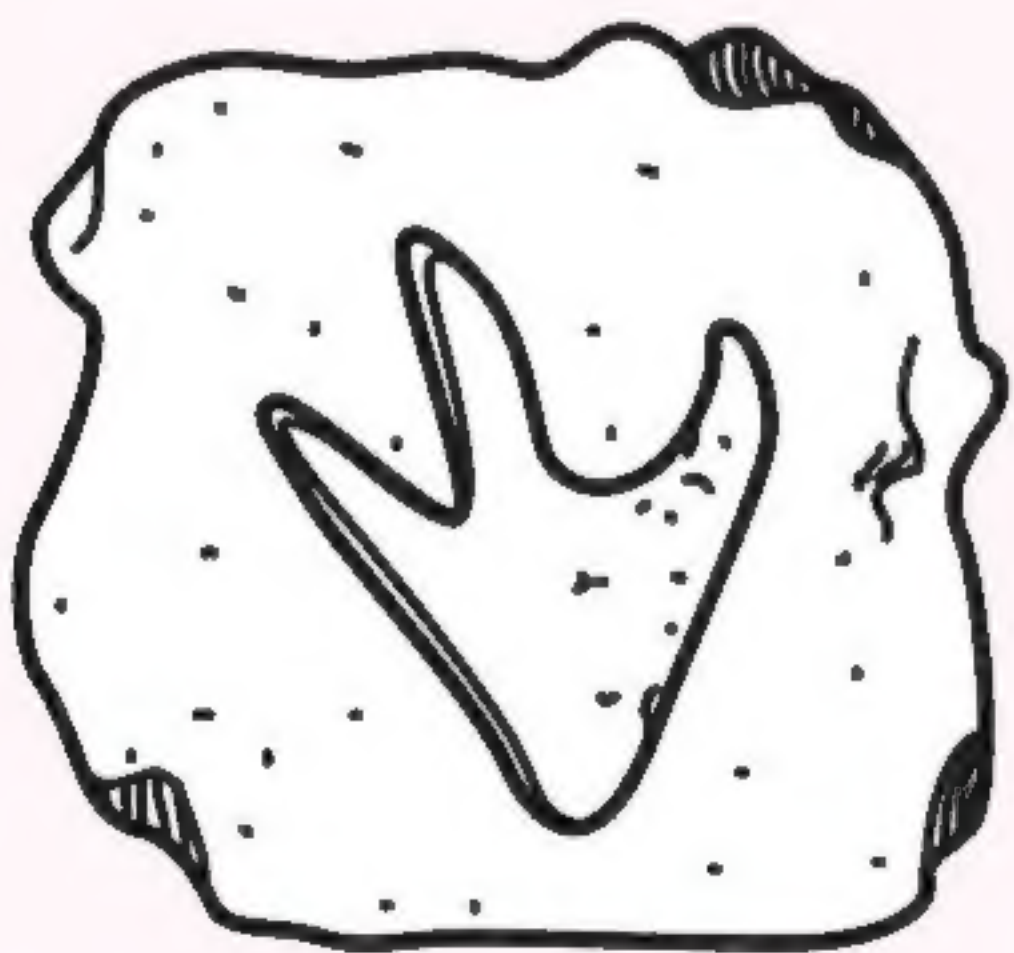


.....
studies fossils.



.....
studies life forms
in the oceans.

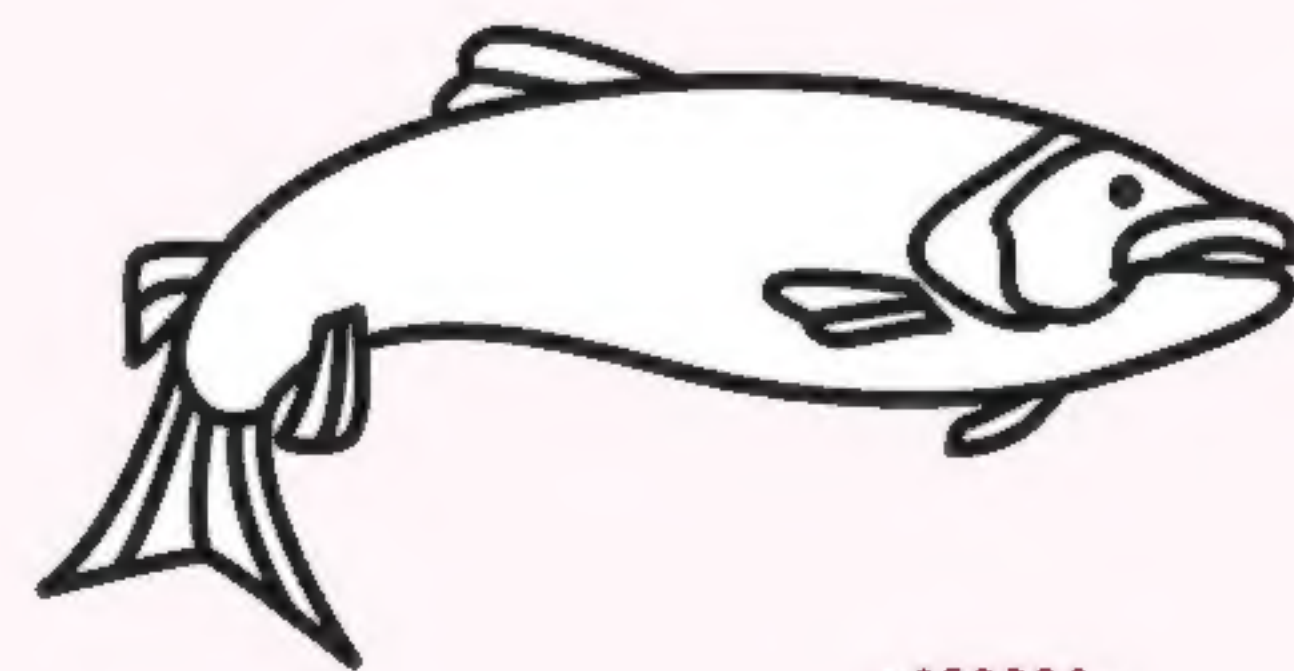
Write **P** near the objects that interest a paleontologist, **MB** near the ones that interest a marine biologist, and **M** near the ones that interest a meteorologist.



Dinosaur footprint



Clouds



Fish



Jellyfish



Dinosaur teeth



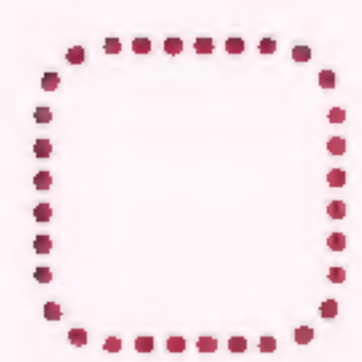
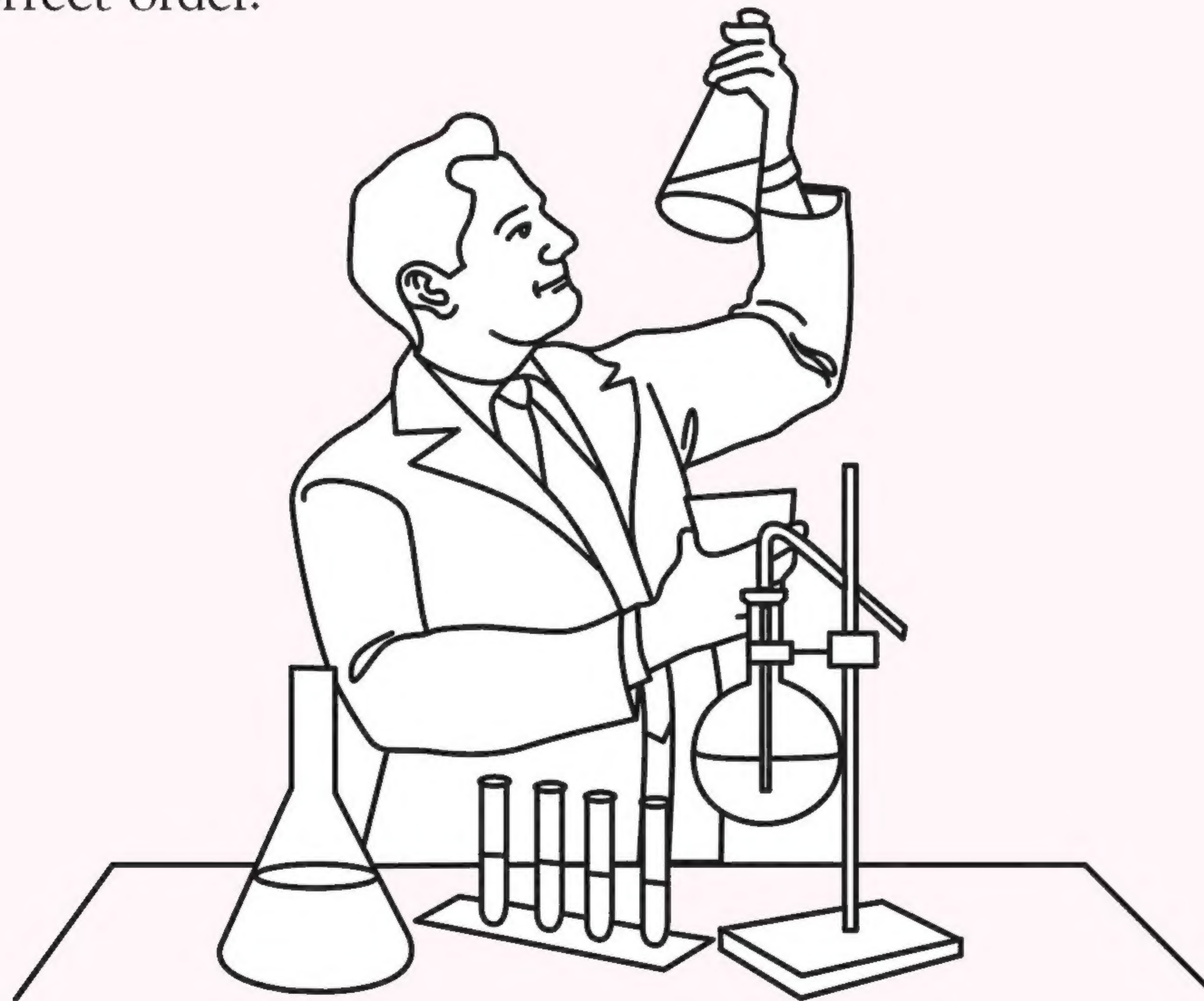
Tornado



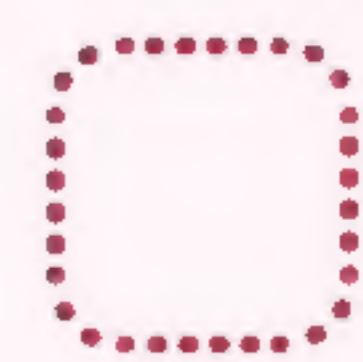


Scientific investigations follow a step-by-step process called the scientific method. First a scientist asks a question about why something happens. He or she then researches the subject to come up with a theory, called a hypothesis. Experiments are carried out to test the hypothesis. The scientist then reaches a conclusion which may or may not prove the theory is true. Finally, the results must be published so other scientists can check the hypothesis.

Using the numbers 1 to 6, put the six steps of the scientific method in the correct order.



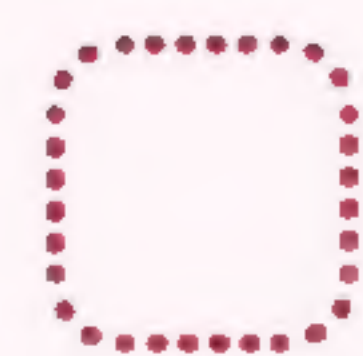
Report the results.



Ask a question.



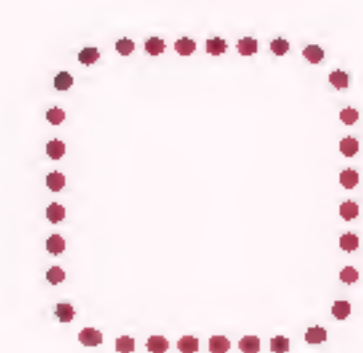
Come up with a hypothesis.



Analyse the results to reach a conclusion.



Do experiments to test the hypothesis.



Do research.



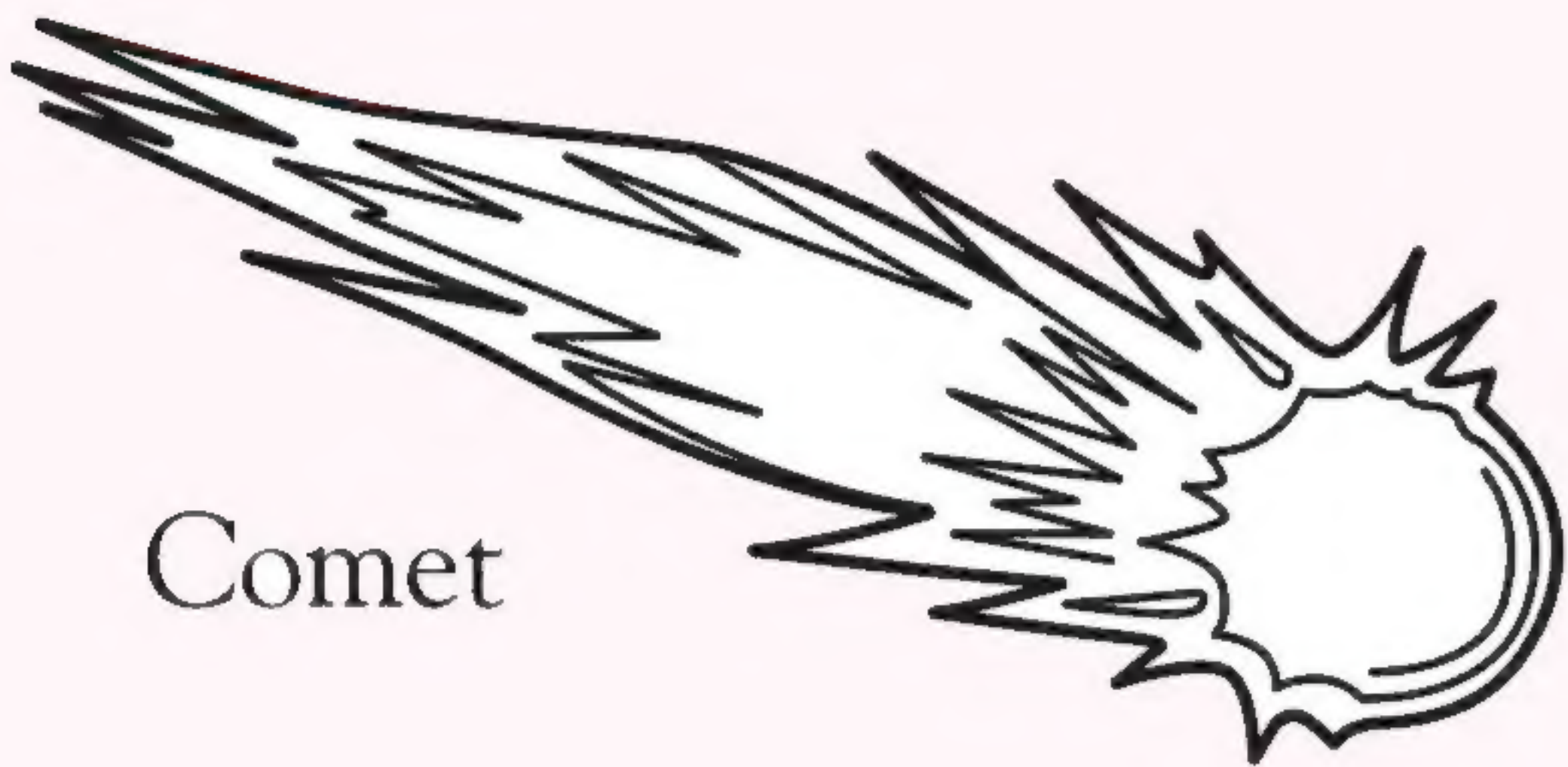


The Solar System

FACTS

Besides the sun, there are seven major types of object in the solar system. Many of them move in an orbit—a curved path around another object.

Draw a line from each type of object to the correct definition.



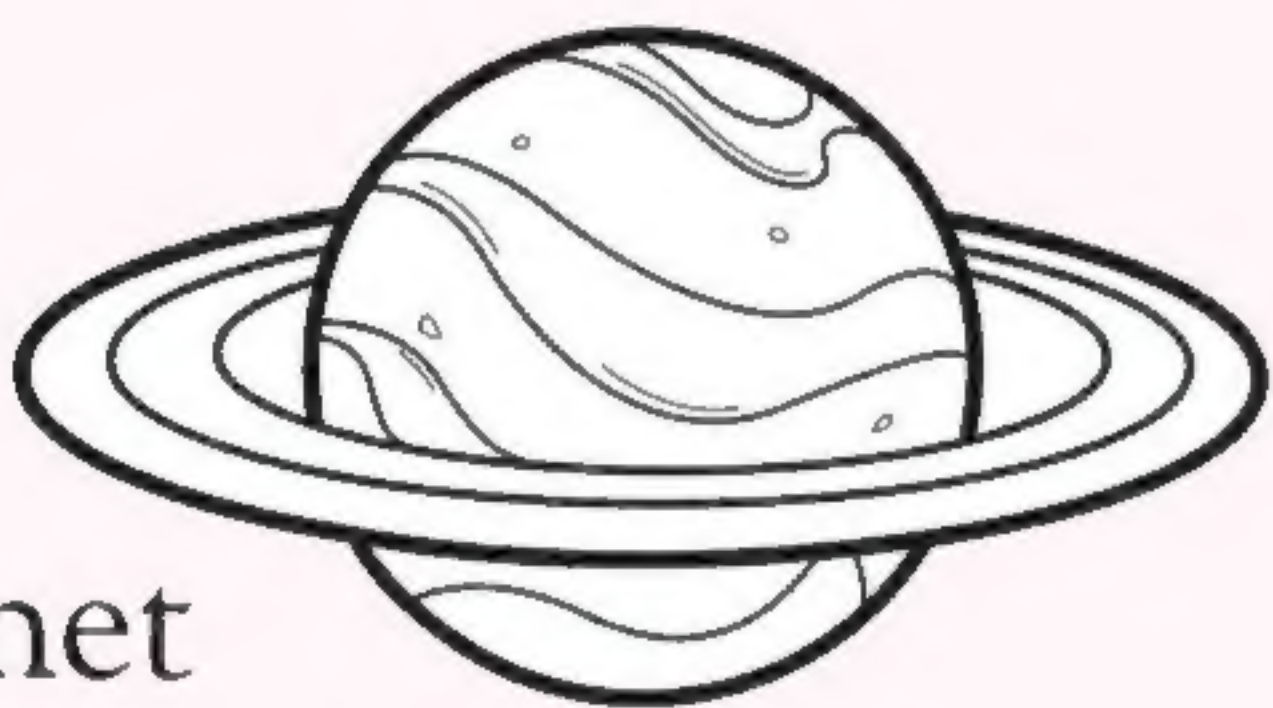
Comet

A small round object that orbits the sun.



Moon

An irregularly shaped object made of rock and metal. Millions of them orbit the sun in a belt between two particular planets.



Planet

A mass of ice, rock, and dust. It orbits the sun, blazing a bright path through the sky as it nears the sun.



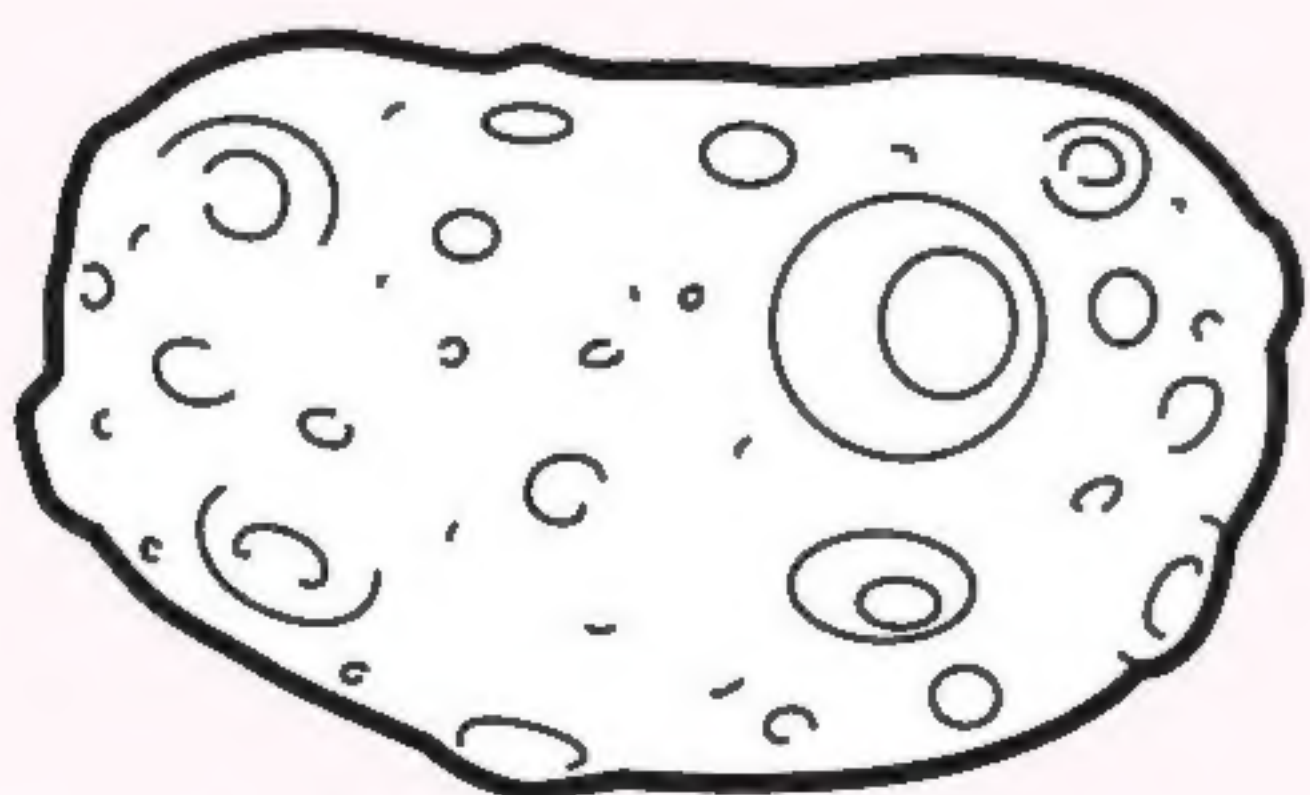
Meteor

A large, round object that orbits the sun.



Dwarf planet

A round object that orbits a planet or a dwarf planet.



Asteroid

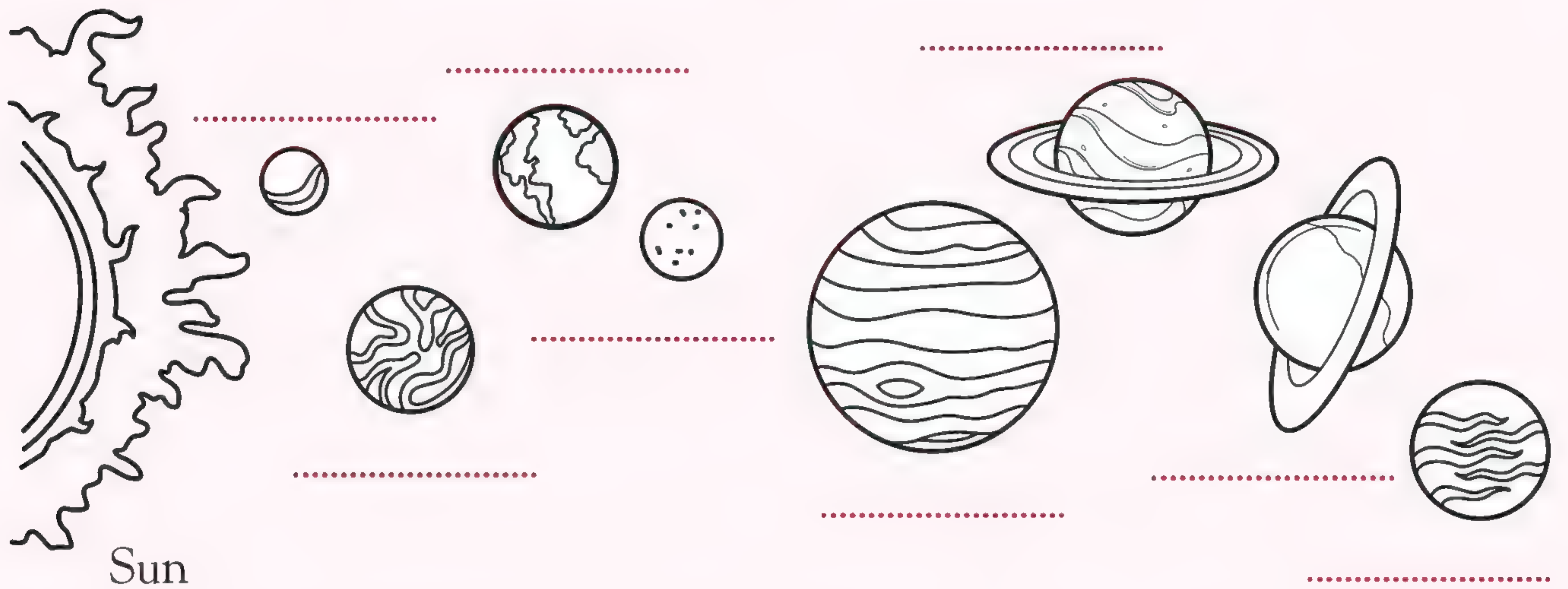
A small, rocky object. Thousands pass Earth every year. They are called meteors, or shooting stars, when they burn up in the atmosphere.





There are eight planets in the solar system. In order from the sun, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

The planets are shown here in their order from the sun. Label each one correctly. They are not shown to scale.



Answer these questions about the planets.

1. Which is the biggest planet?
2. Which planet is nearest to the sun?
3. Which planet is farthest from the sun?
4. Which planet is closest to Earth?
5. Which planets are surrounded by rings?
6. Although this planet lies second from the sun, it is the hottest of them all.
7. Which planet looks tilted on its side, because its rings orbit from top to bottom?





Structure of the Solar System

FACTS

The solar system is the group of planets and other objects that orbit the sun, the huge star at the center. There are eight planets—four small planets close to the sun made of rock, and four large outer planets made of gas and surrounded by rings of ice, dust, and rock. The time it takes for each planet to orbit once around the sun is its year. As the planets travel, they also rotate. One complete rotation is called a day.

Use the words in the box below to complete the sentences.

Day

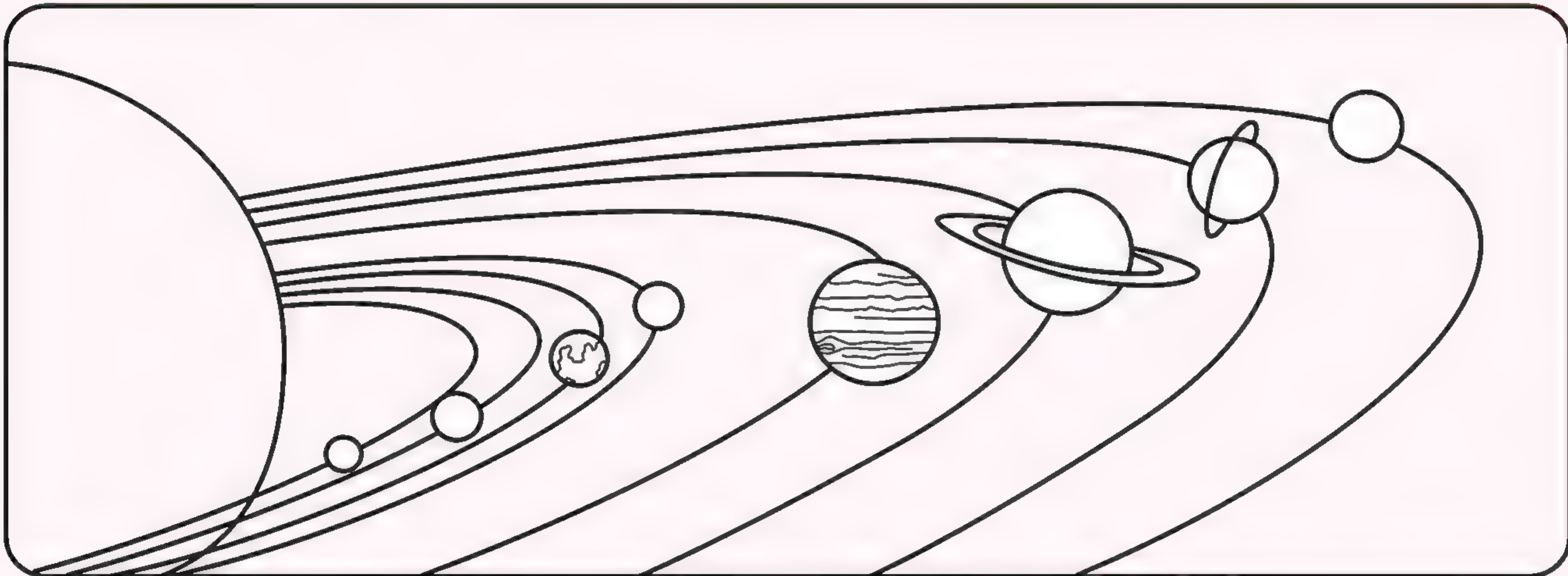
Gas

Rings

Rock

Star

Year

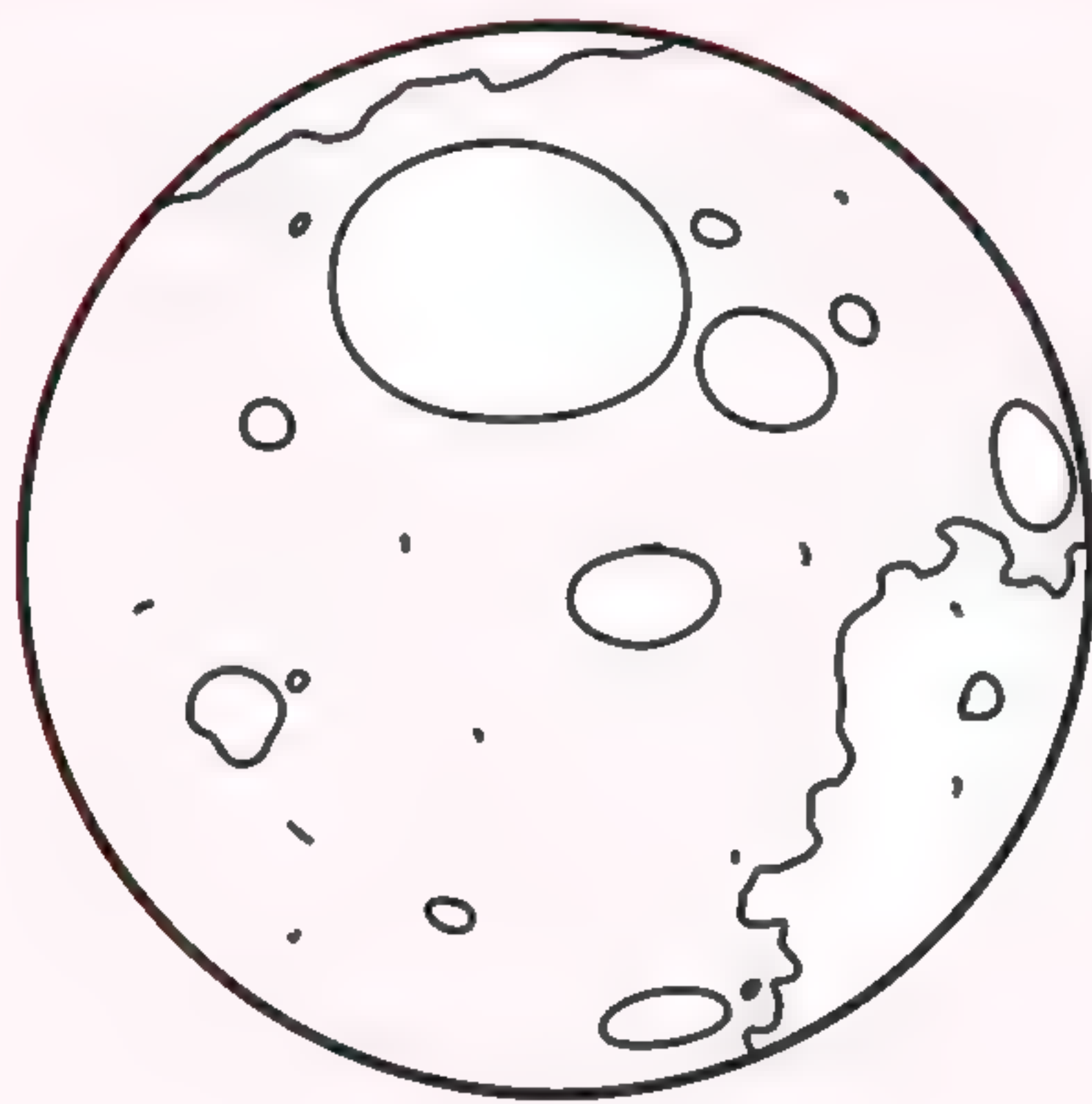


1. The sun is the at the center of our solar system.
2. A is the time it takes for a planet to rotate once.
3. The four small inner planets are made of
4. The four giant outer planets are made of
5. The outer planets have made of ice, dust, and rock.
6. A is the time it takes for a planet to complete one orbit around the sun.



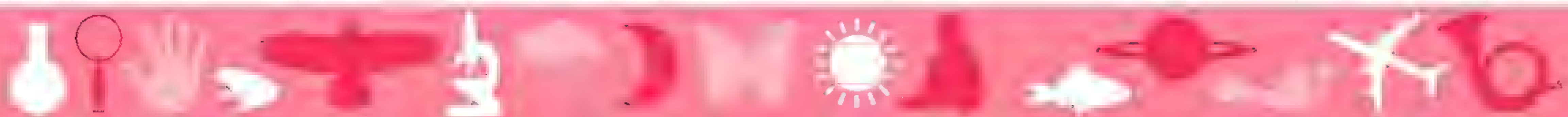


A moon is a natural object that orbits a planet. In the solar system there are more than 160 known moons. Earth has just one moon, but some planets have many. Only Mercury and Venus have none. All moons are made of rock, or rock and ice, and many have surfaces marked by craters, formed by collisions with asteroids. Our moon is rocky and about a quarter the size of Earth, which it orbits every 28 days. The distance between the moon and Earth is 238,855 miles, which takes a spacecraft about 60 hours to travel.



Circle the correct answer to these questions.

1. What is Earth's moon made up of?
 - A. Lava
 - B. Rock
 - C. Ice
2. What is the name of the thousands of marks on the moon's surface?
 - A. Caverns
 - B. Craters
 - C. Crevasses
3. The marks on the moon were created by collisions with what objects?
 - A. Asteroids
 - B. Meteorites
 - C. Planets
4. Approximately how long does it take for the moon to orbit Earth?
 - A. One day
 - B. One week
 - C. One month
5. How long does it take a spacecraft to travel to the moon from Earth?
 - A. 24 hours
 - B. 60 hours
 - C. 100 hours
6. Which of these planets does not have a moon?
 - A. Neptune
 - B. Mars
 - C. Venus





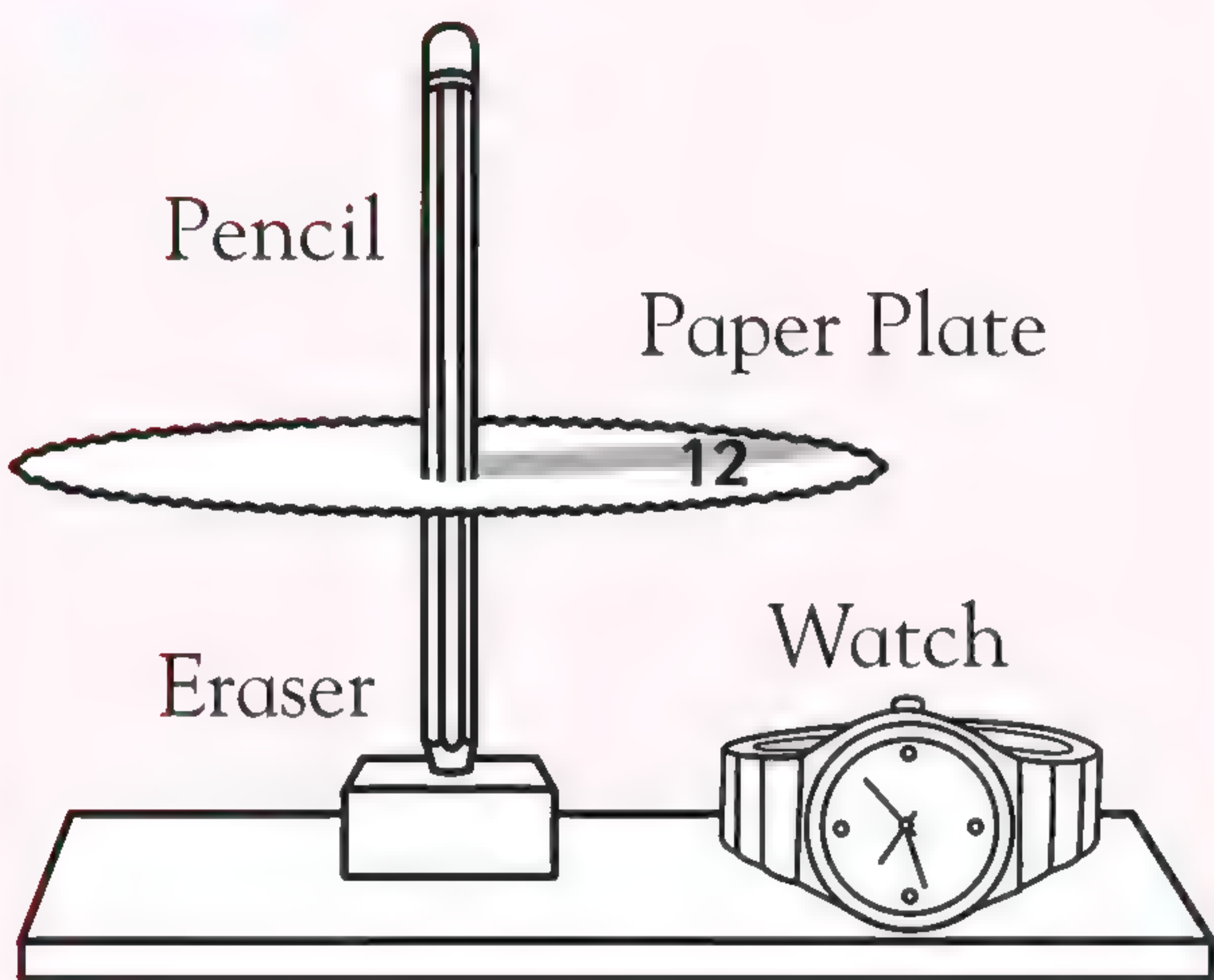
Make a Sundial

FACTS

A sundial uses the light of the sun to tell the time of day. People have used sundials for thousands of years.

TEST

What You Need:



What To Do:

1. Mark a point on the edge of the paper plate and number it 12.
2. Make a small hole in the center of the plate and gently push through the pencil. Press the point of the pencil into the eraser.
3. On a sunny day, find a place that will get direct sunlight all afternoon and evening.
4. At exactly 12 o'clock, position the plate so that the shadow cast by the pencil aligns with the mark for the number 12.

5. Use the watch to keep track of time. At 1 o'clock, mark and write 1 at the point where the pencil's shadow crosses the edge of the plate. Repeat every hour until the sun goes down.

RESULT

What happened to the shadow of the pencil?

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.....

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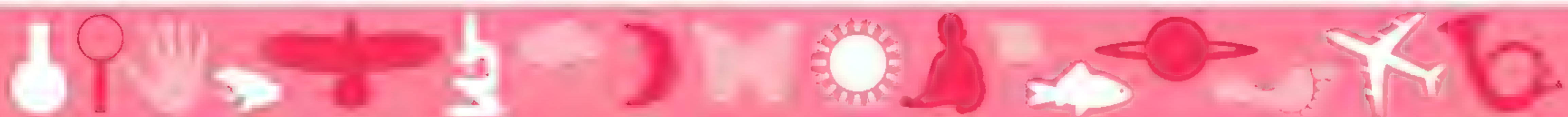
Predict what will happen if you place the sundial in the same place the next day, and why this is useful.

.....

.....

.....

.....





The human skeleton has 206 bones. It supports and shapes the body, and protects the soft internal organs.

Look at the picture and use the words in the box to complete the sentences.

Backbone

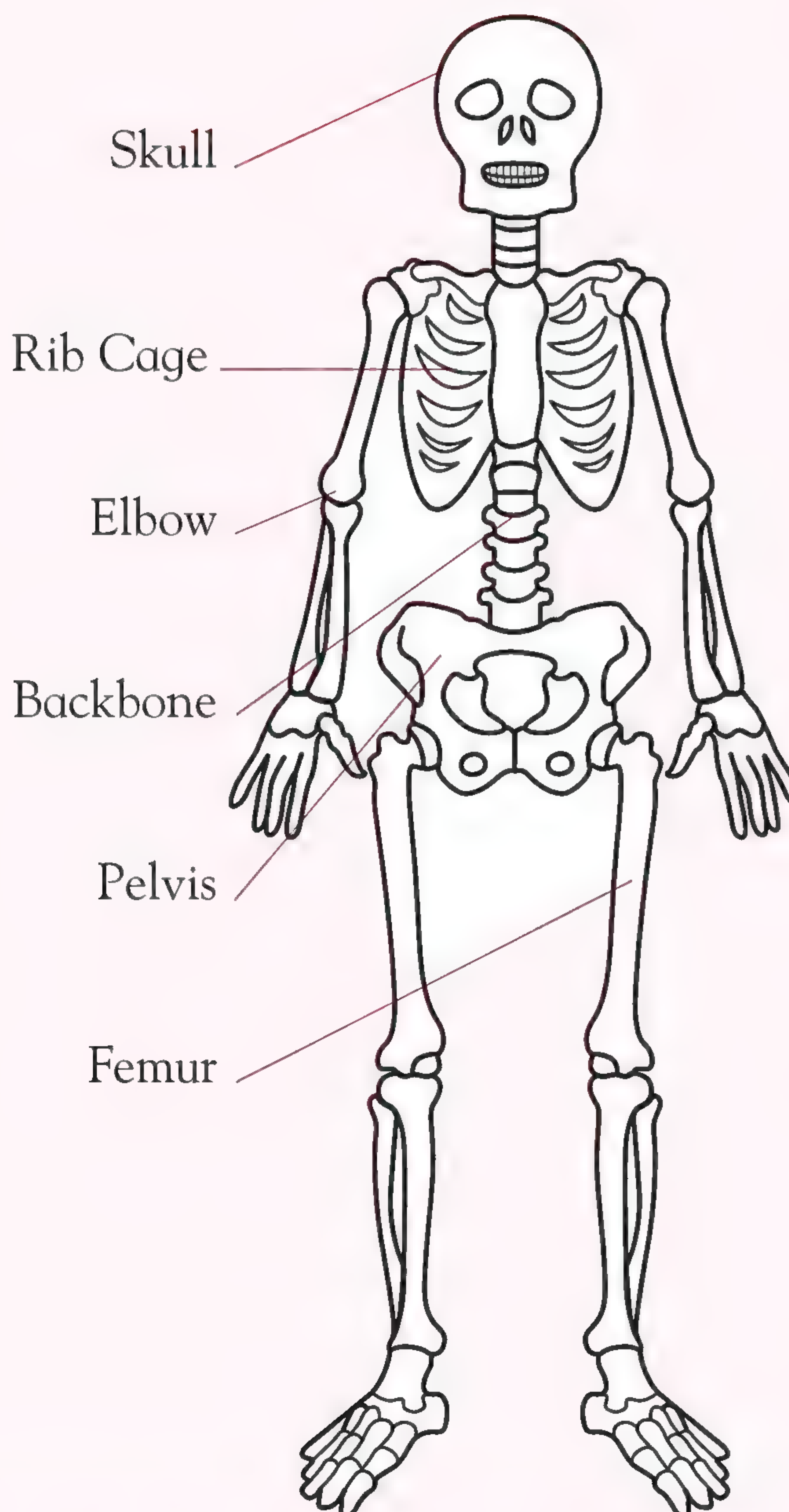
Elbow

Pelvis

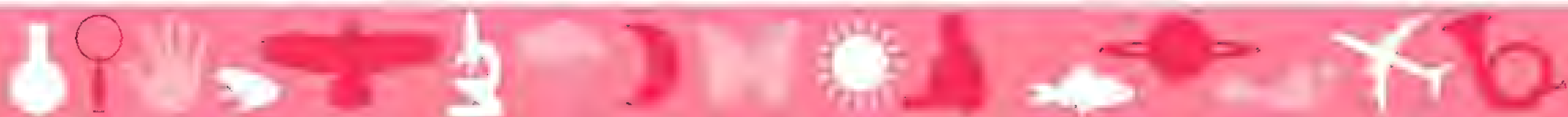
Rib Cage

Skull

Femur



1. The bones of the upper arm and forearm meet at a joint called the
2. The protects the heart and lungs.
3. The protects the brain.
4. The protects the spinal cord.
5. The protects the organs of digestion and reproduction.
6. The is the longest bone in the body.





Types of Muscle

FACTS

We have different types of muscle in our bodies. We can control some of them, like the muscles in our arms and legs. These are called voluntary muscles. Others we can't control, like the muscles that automatically help us breathe, eat, and pump our heart. These are called involuntary muscles.

Write **V** next to each activity that is controlled by voluntary muscles and **I** next to each activity that is controlled by involuntary muscles.

☐

Talking

☐

Bicycling

☐

Walking

☐

Heart rate

☐

Digestion of food

☐

Shivering

☐

Playing a musical instrument

☐

Circulation of blood





Muscles are attached to bones by strong fibers called tendons. The muscles and tendons pull on the bones to make the body move. Where two bones meet is called a joint. There are different types of joint, which allow movement in different ways.

Look at the picture and use the words in the box to complete the sentences.

Achilles tendon

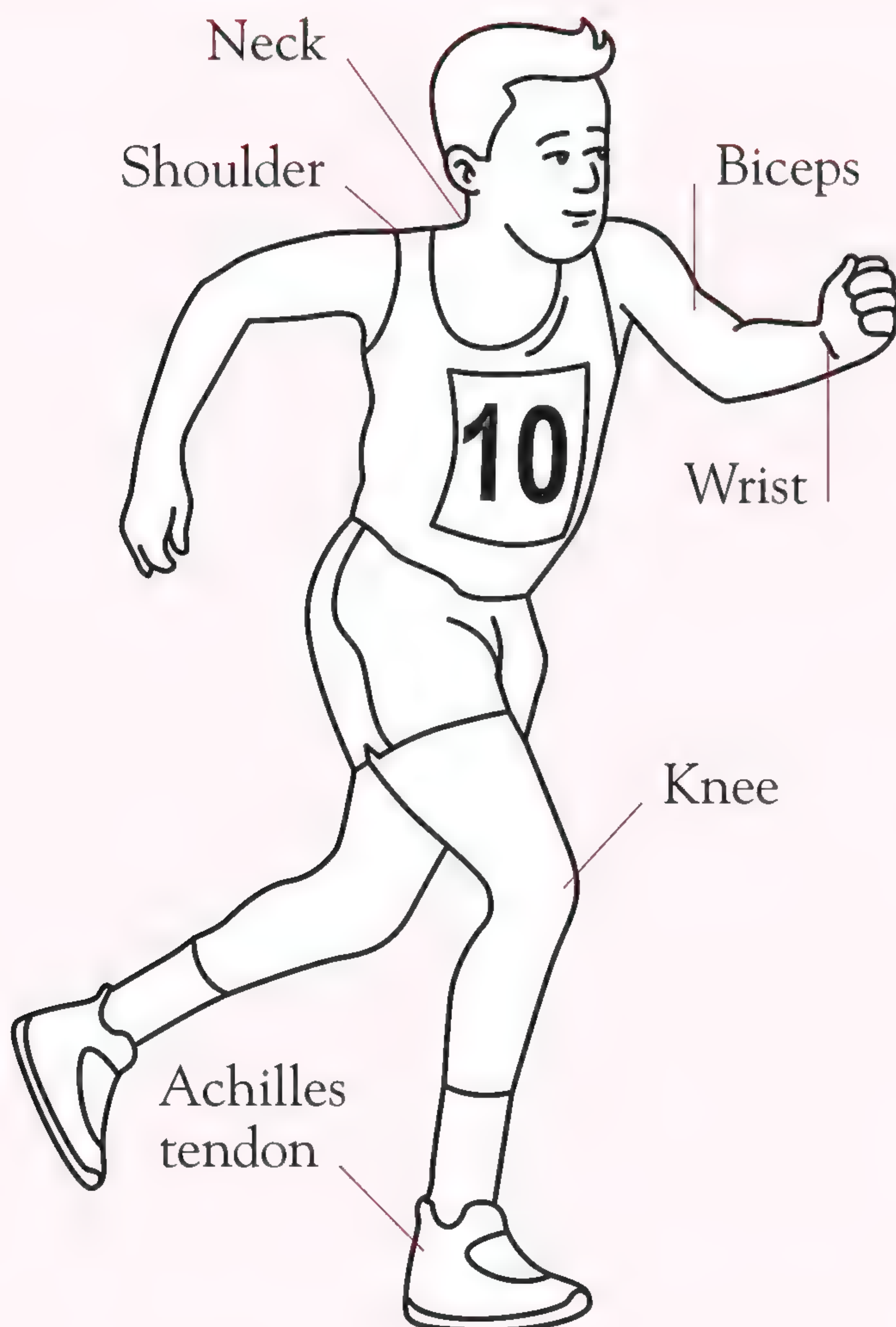
Biceps

Knee

Neck

Shoulder

Wrist



1. The joint where the hand meets the forearm is called the

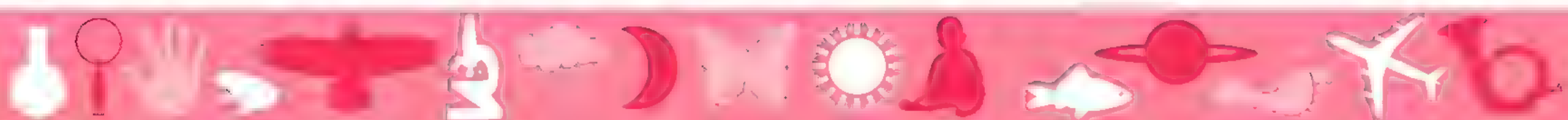
2. The attaches the leg bone to the heel.

3. The joint, where the leg bones meet, moves like a hinge.

4. The muscle at the front of the upper arm is called the It helps raise the forearm.

5. A joint in your lets you turn your head from side to side. It is called a pivot joint.

6. The joint allows you to swing your arm in many different directions. It is called a ball and socket joint.





The Heart

FACTS

The heart is the body's hardest-working muscle. It never stops pumping blood around the body. You can feel the pumping as your heartbeat, or pulse. Each pulse equals one beat of the heart. The number of heartbeats per minute is your heart rate.

TEST What You Need:



Stopwatch

Five people of very different ages, from your friends to your grandparents.



What To Do:

1. Measure the pulse of each person. You will find it on the neck, just below the jaw. Count the number of beats in 15 seconds and then multiply the number by 4.
2. Plot the heart rate of each person on the chart below, then connect the dots.



RESULT



What does the line connecting the dots tell you about the human heart?

.....

.....

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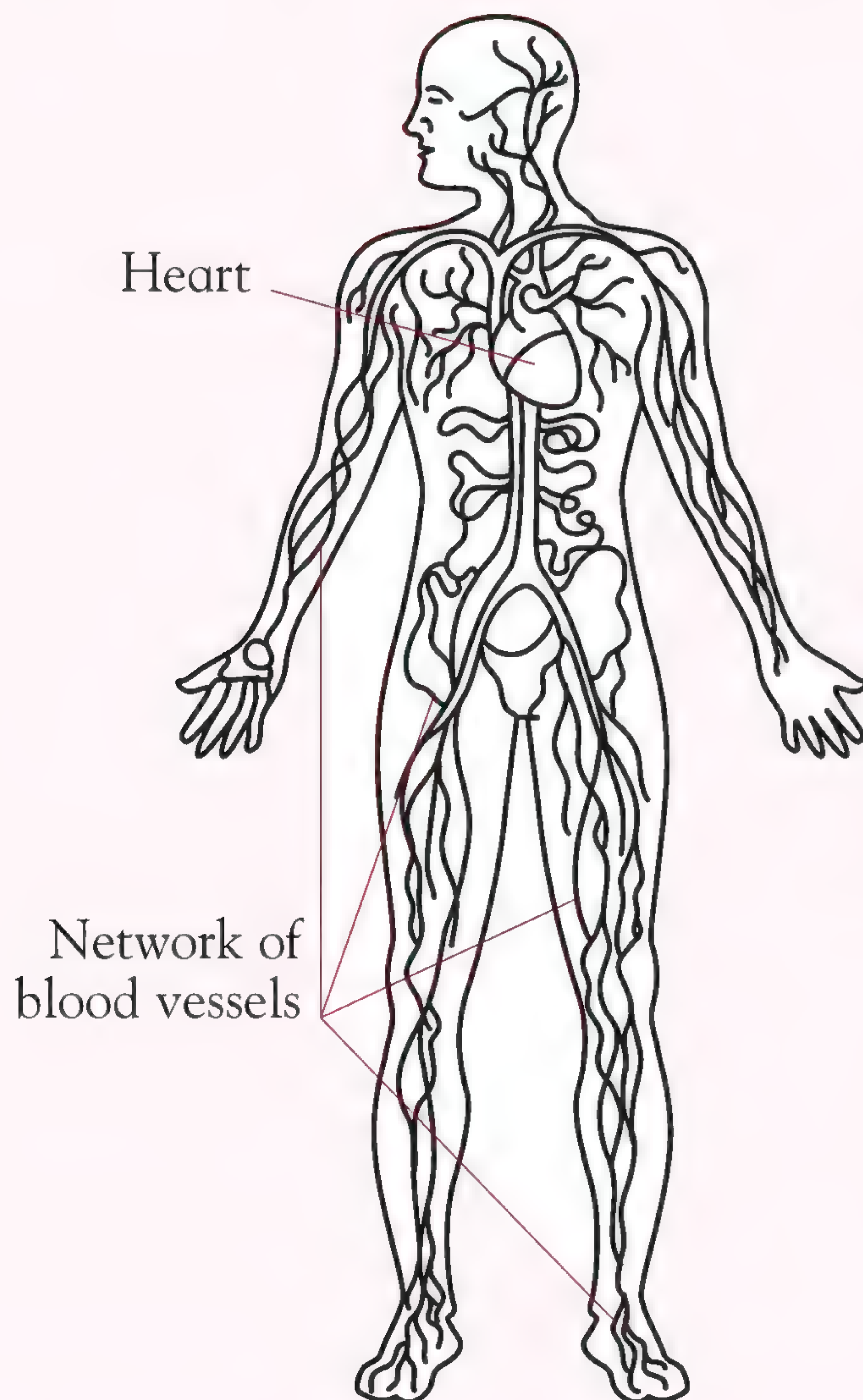




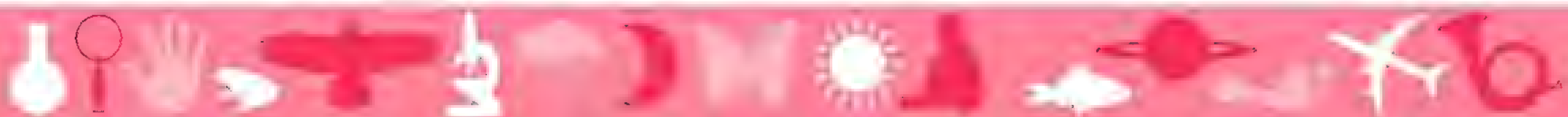
The continuous movement of blood around the body is called circulation. The heart pumps the blood through a network of blood vessels. Blood pumped out of the heart has come from the lungs, and is rich in oxygen. The blood delivers oxygen to cells all over the body and picks up waste products, such as carbon dioxide, then returns to the heart. There are two types of blood vessels: arteries carrying blood from the heart to the body, and veins carrying blood back to the heart.

Use the words in the box below to complete the sentences.

Arteries Carbon dioxide Heart Lungs Oxygen Veins



1. The blood is pushed around the body by the pumping action of the
2. Blood vessels that take blood from the heart around the body are called
3. Blood vessels that carry blood from the body back to the heart are called
4. Blood picks up from the, and transports it to the cells all over the body.
5. Cells release waste products, such as into the blood.





The Ear

FACTS

Sound travels through the air in waves of pressure. These sound waves pass into the ear and vibrate a thin skin, called the eardrum. This is linked to three tiny bones (the hammer, anvil, and stirrup) that make the vibrations louder and pass them on to a coiled tube filled with fluid, called the cochlea. Here the vibrations are turned into electrical signals that travel to the brain along the auditory nerve. Three tubes also in the ear, called the semi-circular canals, detect head movements to help control balance, and tell you which way up you are.

Use the words in the box to complete the sentences.

Anvil

Brain

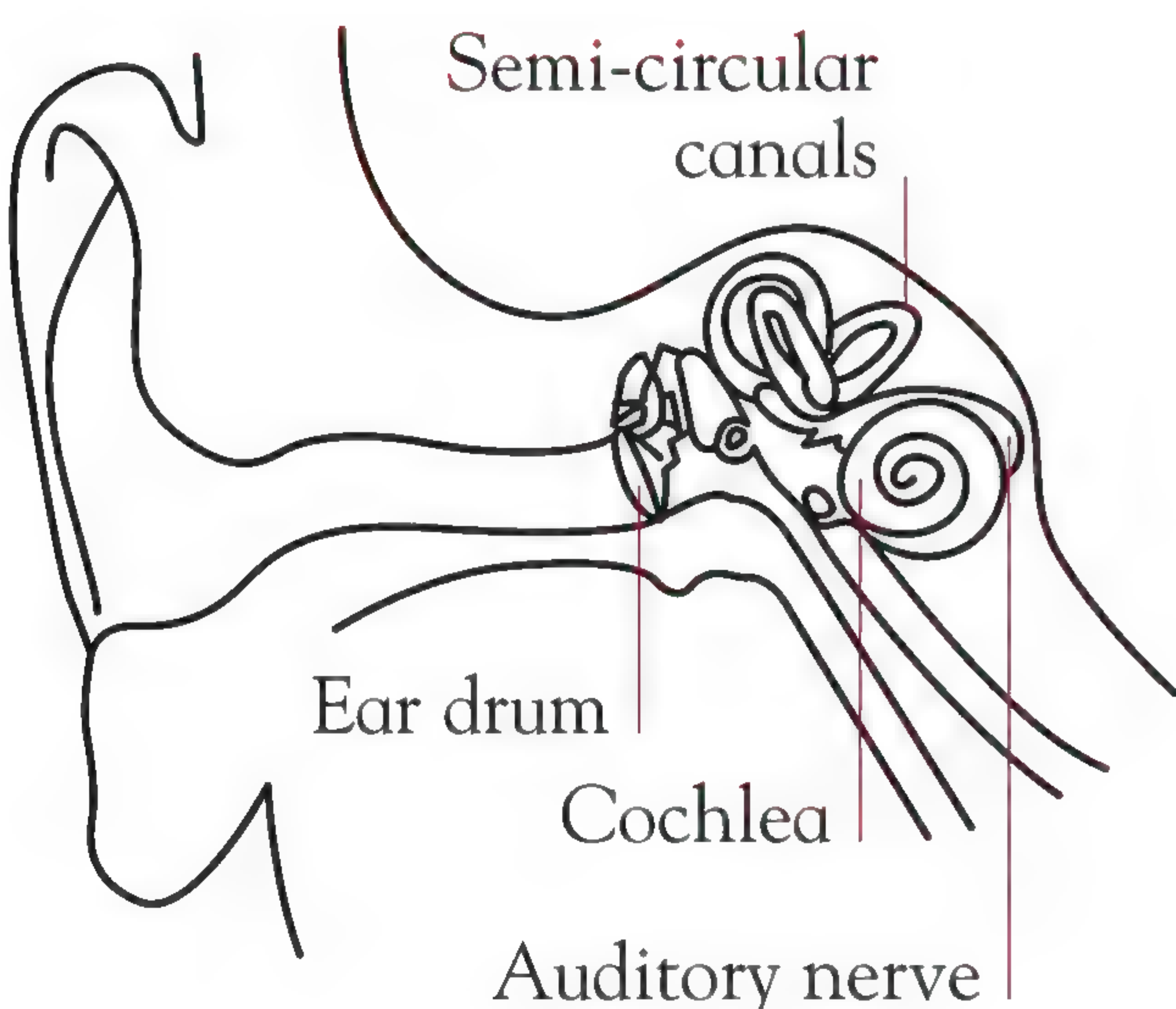
Eardrum

Hammer

Pressure

Semi-circular canals

Stirrup



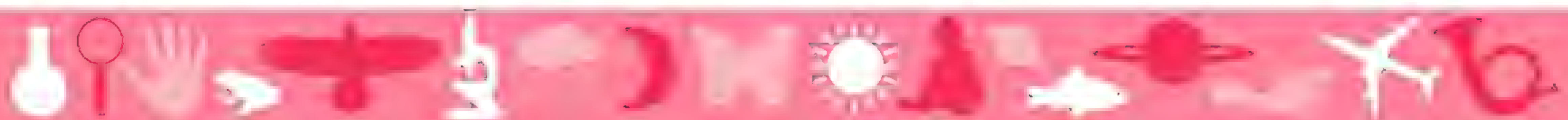
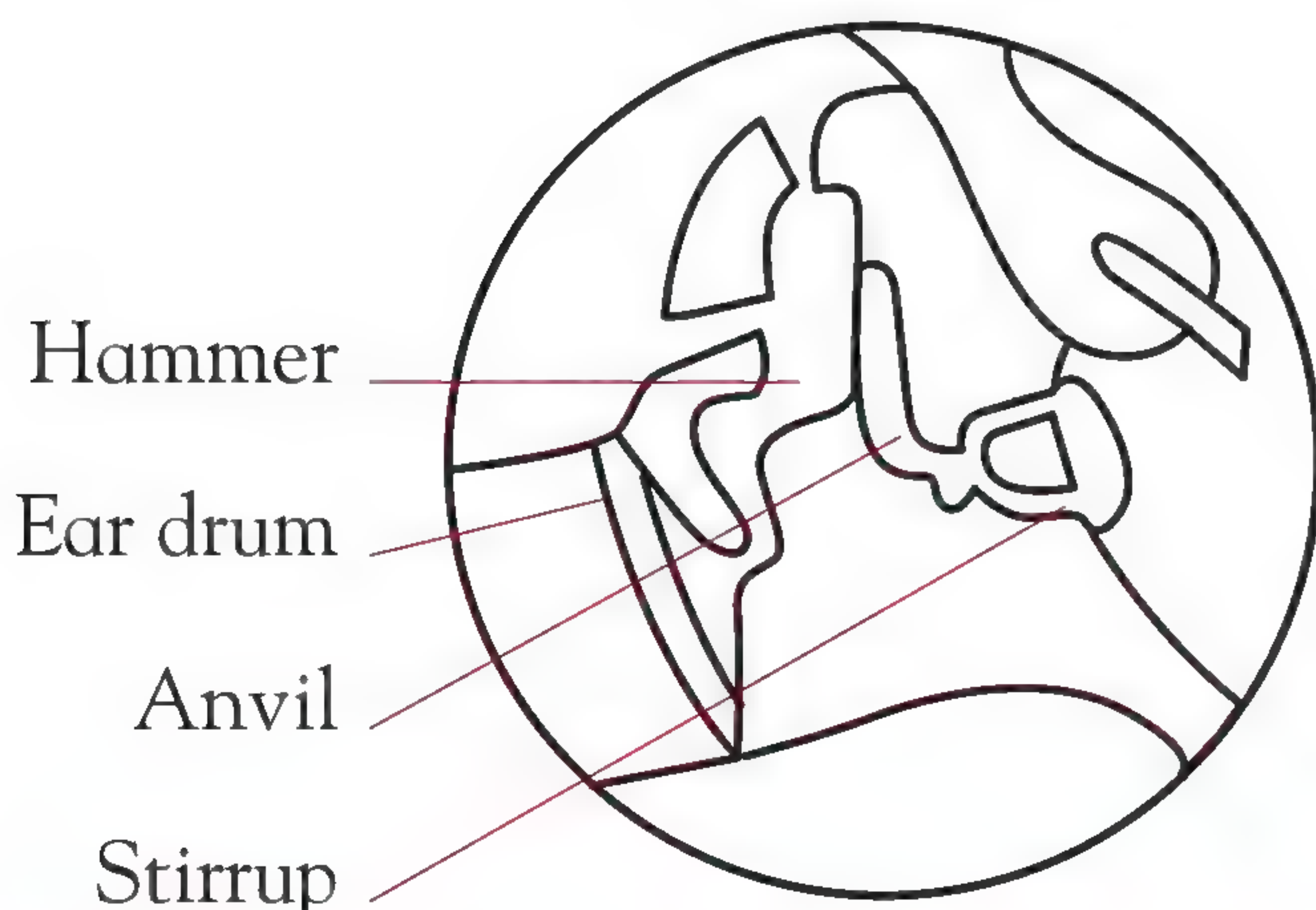
1. The ear detects waves of called sound waves, which travel through the air.

2. The is a thin skin in the inner ear that vibrates when sound waves meet it.

3. Three bones, the, and make the sound waves louder. They are the smallest bones in body.

4. The is able to identify the type, pitch, volume, and direction of a sound from electrical signals.

5. The ear also contains three small tubes, called the that help you balance, and tell you which way is up, and which is down.

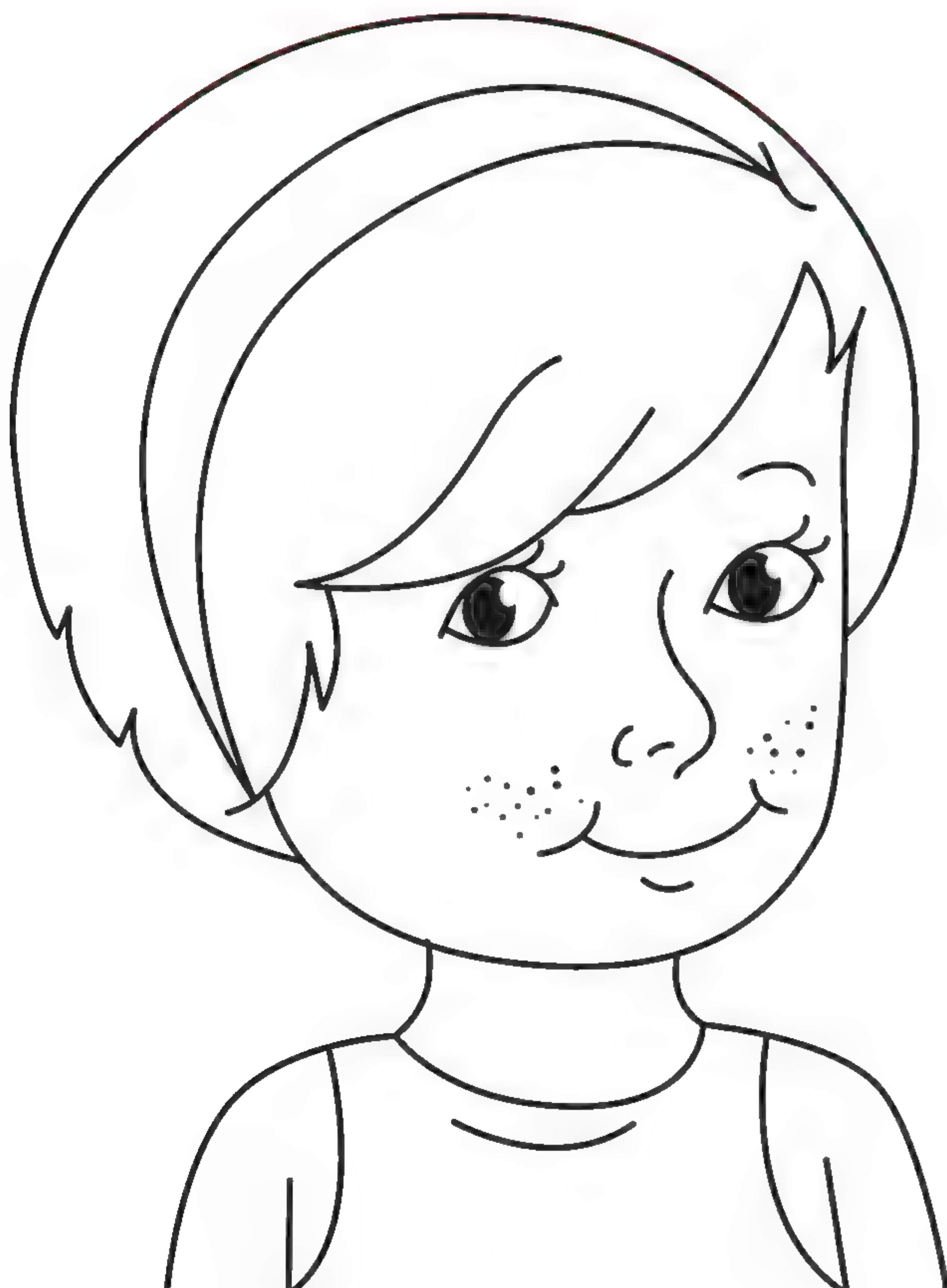




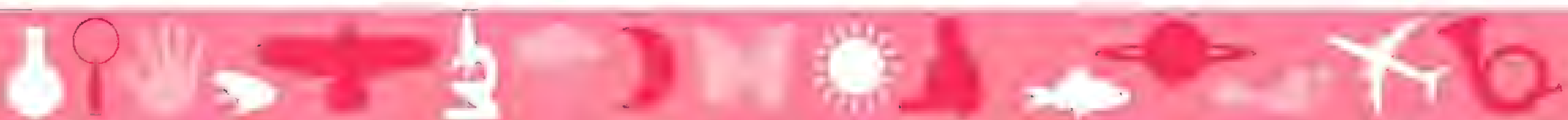
The skin has two layers: the waterproof outer layer, called the epidermis, which protects the body from germs and the sun, and the dermis, which contains blood vessels. The skin also helps control body temperature. When we are cold, we get goosebumps as hairs in the skin rise to trap a layer of warm air. When we are hot, it releases sweat to cool the body from tiny openings called pores. Nerves in the skin give us our sense of touch.

Use the words in the box to complete the sentences.

Dermis Epidermis Germs Goosebumps Nerves Pores



1. The skin protects the body from and harmful rays from the sun.
2. The outer layer of the skin is called the
3. The inner layer of the skin is called the
4. in the skin enable us to feel things when we touch them.
5. The tiny openings in the skin, called, release sweat to cool the body.
6. When we are cold, the skin gets



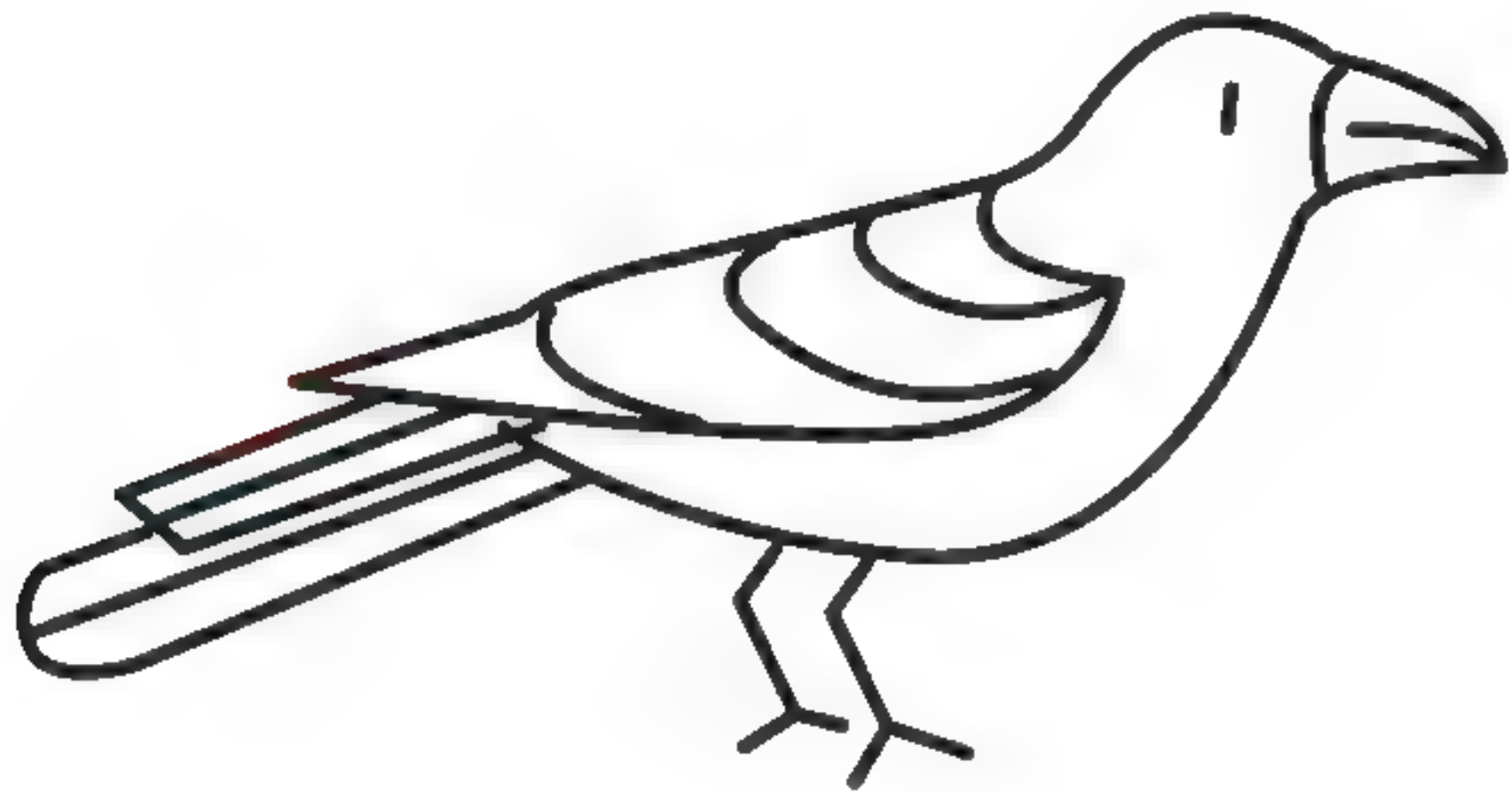


Vertebrates

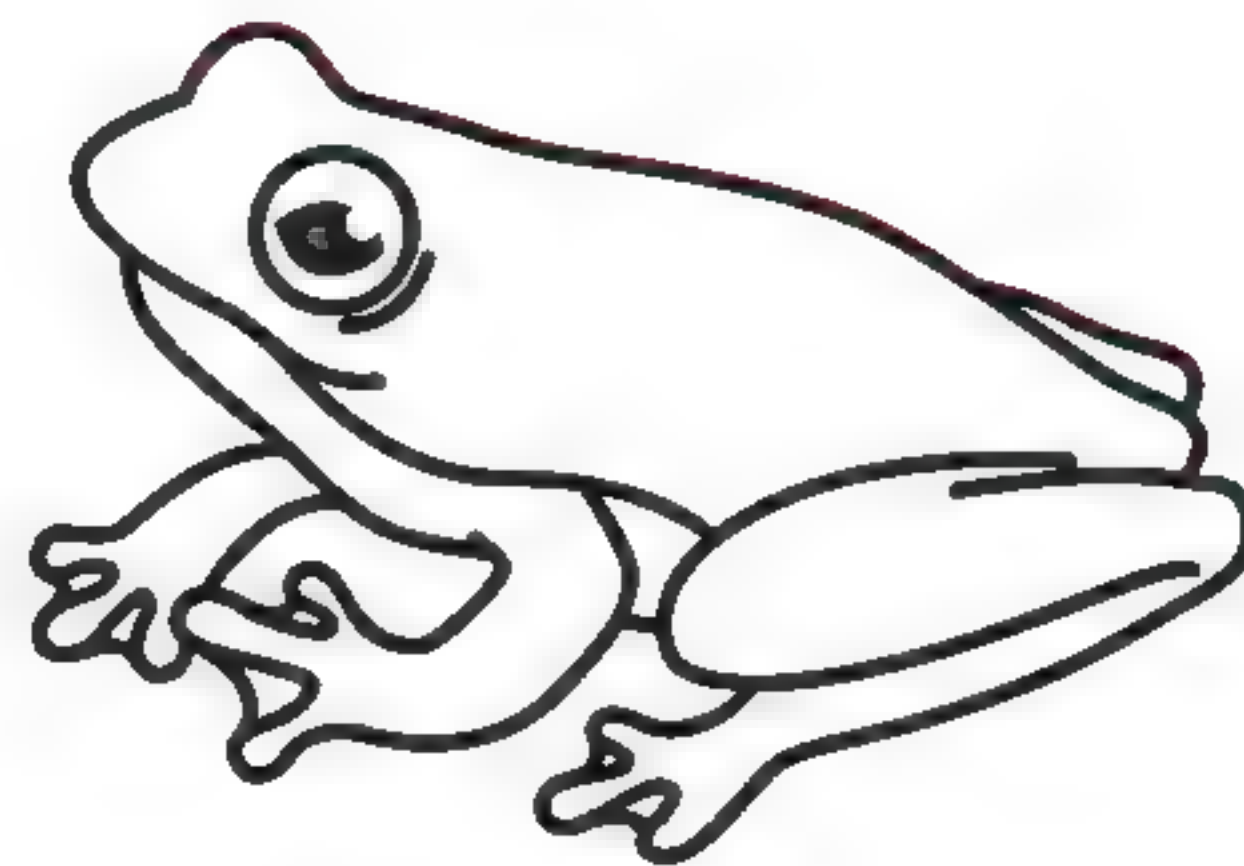
FACTS

A vertebrate is an animal that has a backbone. Mammals, birds, reptiles, amphibians, and fish are all vertebrates.

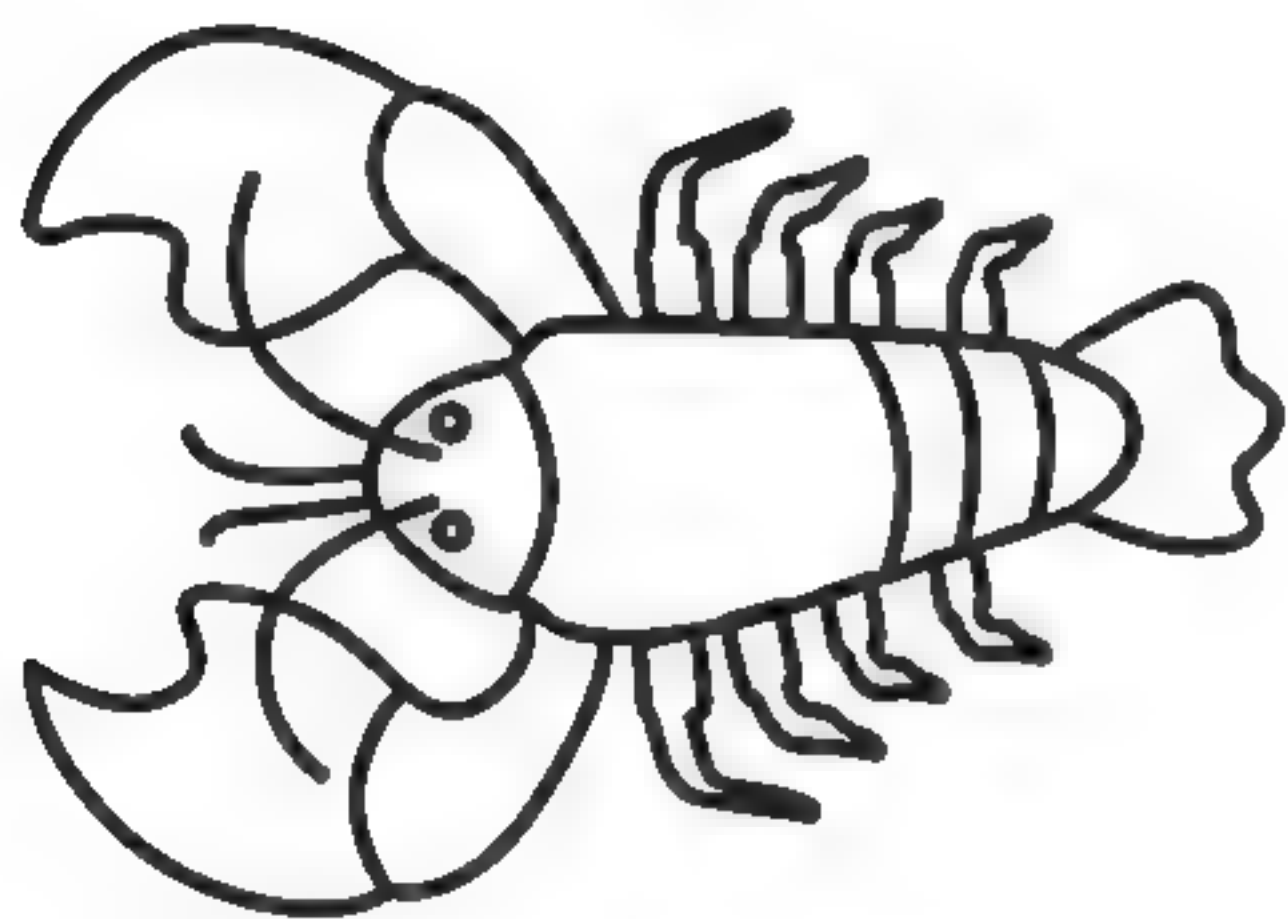
Circle all of the animals that are vertebrates.



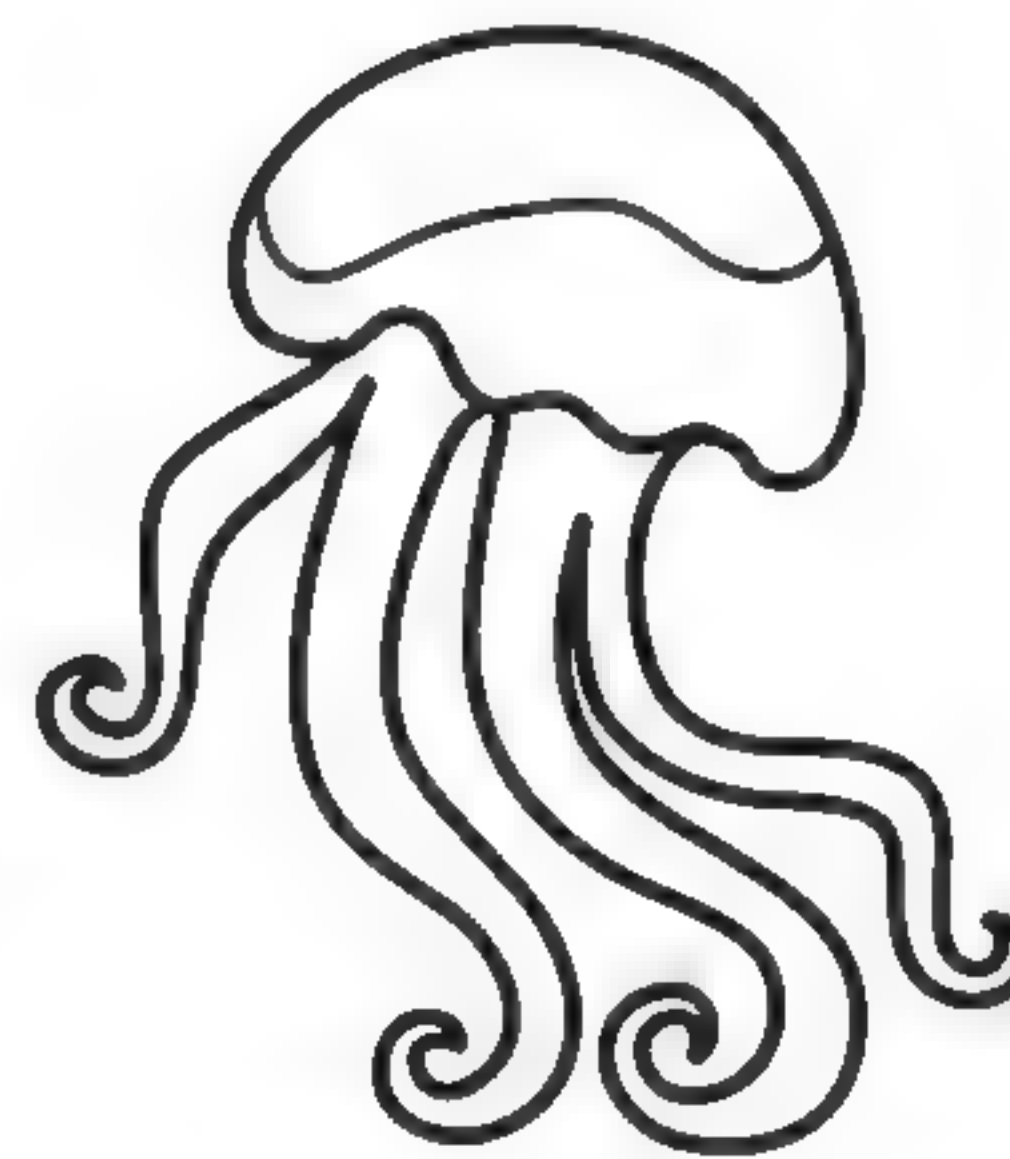
Bird



Frog



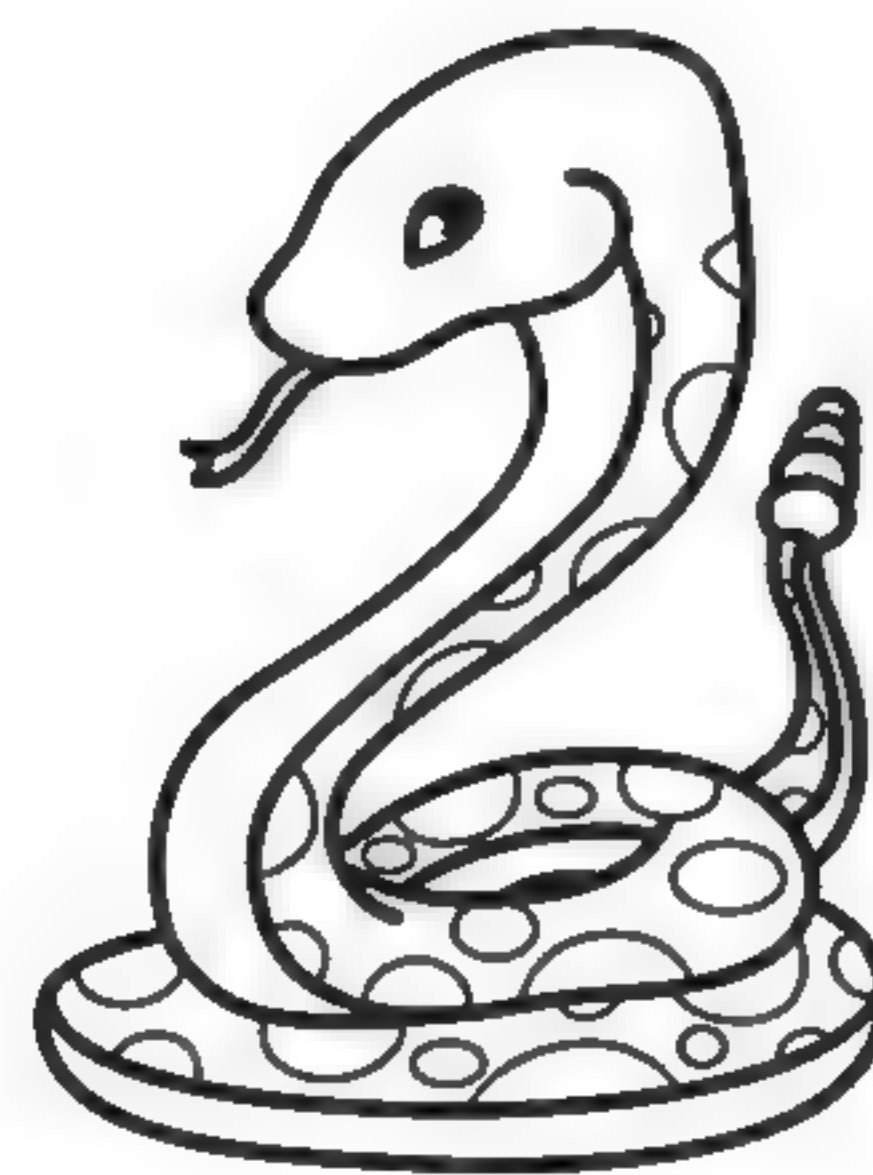
Lobster



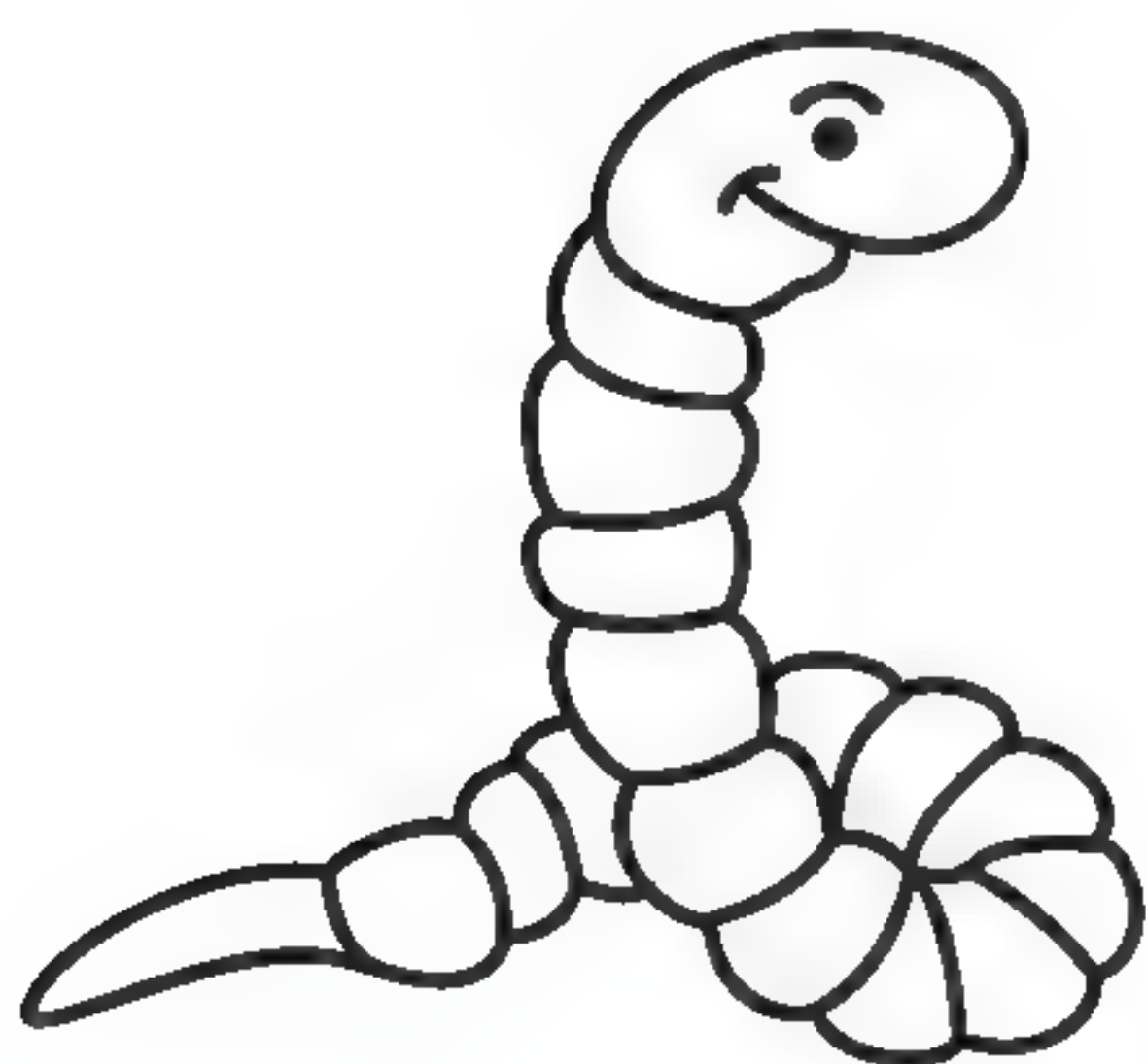
Jelly fish



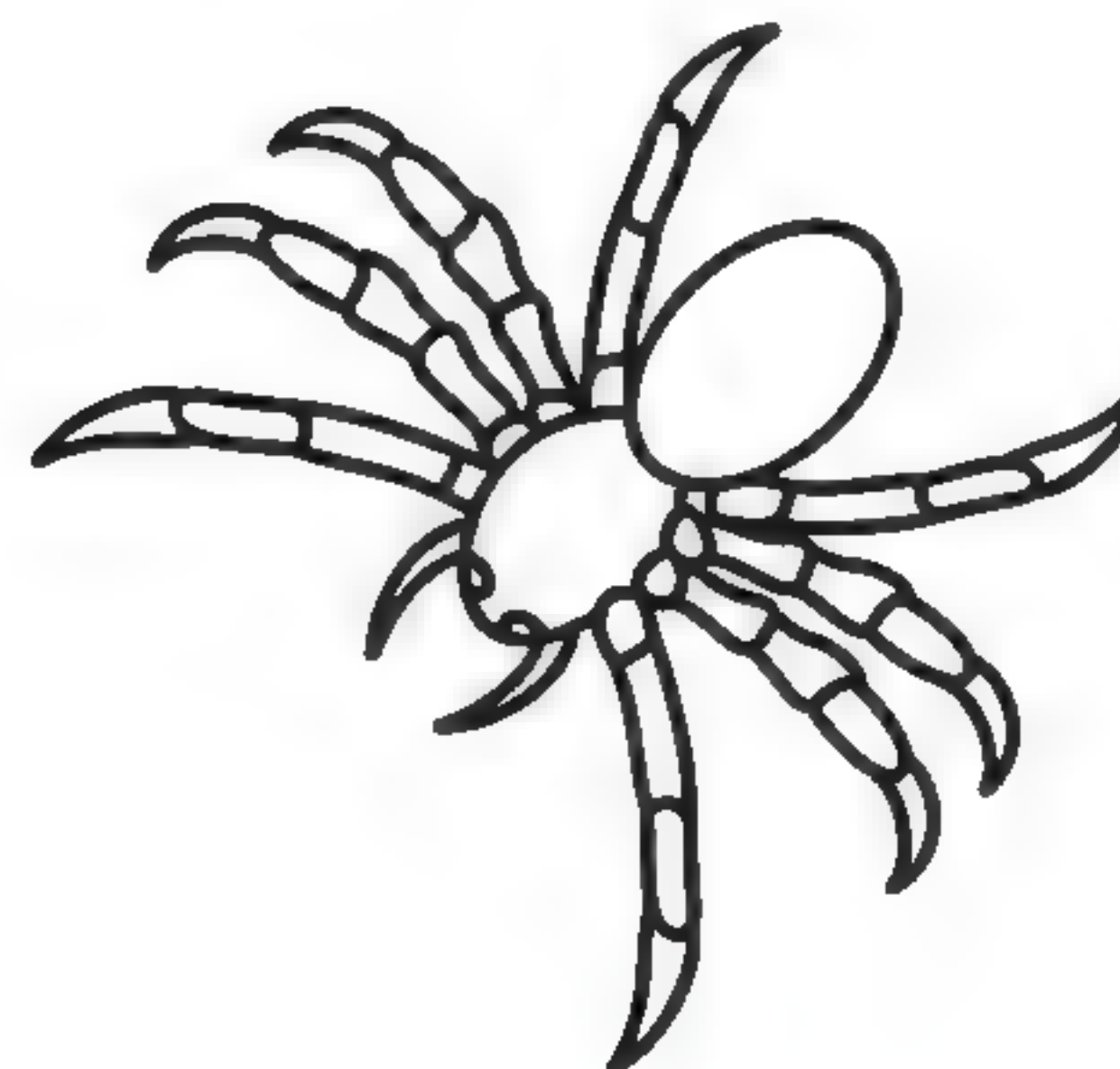
Human



Snake



Earthworm



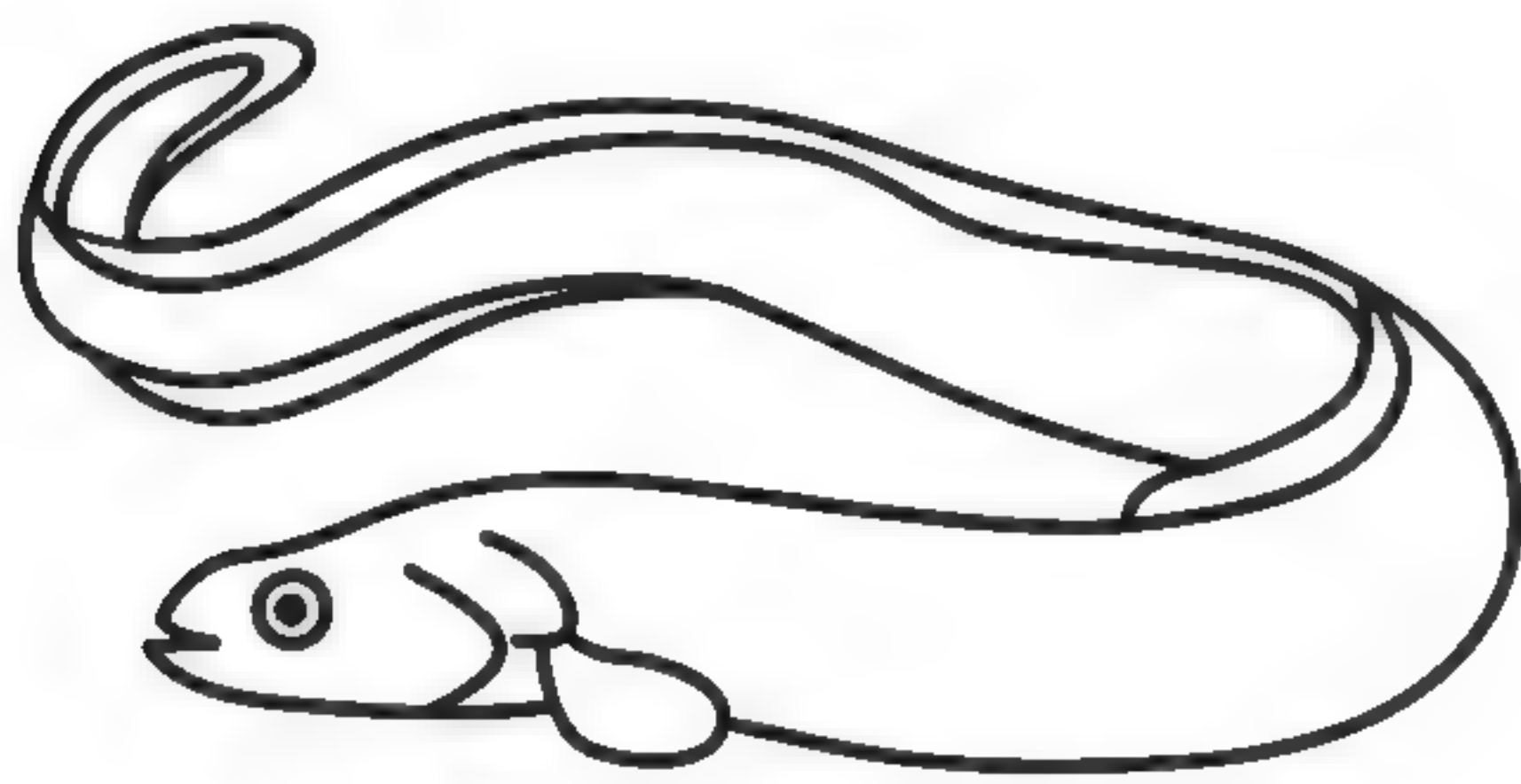
Spider



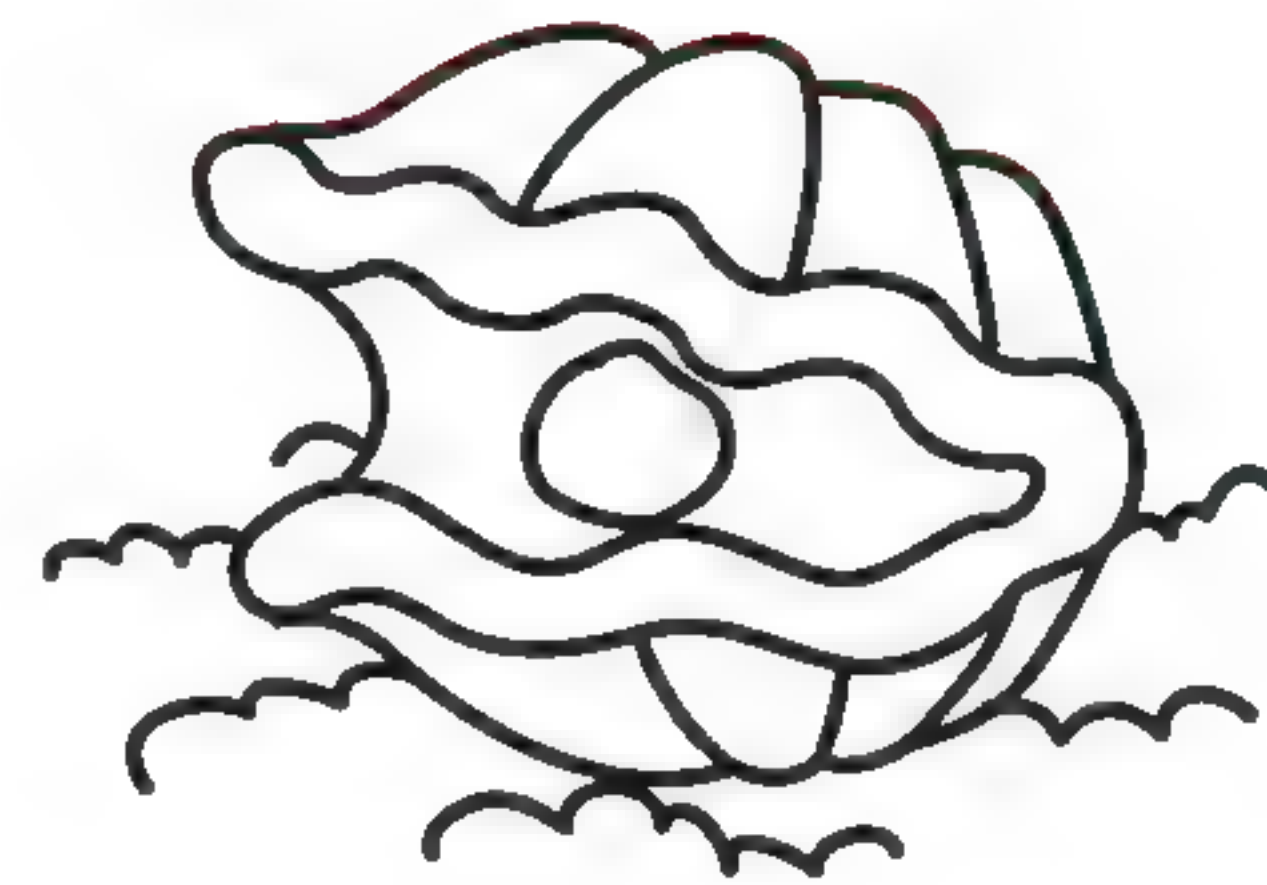


An invertebrate is an animal that does not have a backbone. Insects, worms, and mollusks (such as snails) are invertebrates. Most of the animals on Earth are invertebrates.

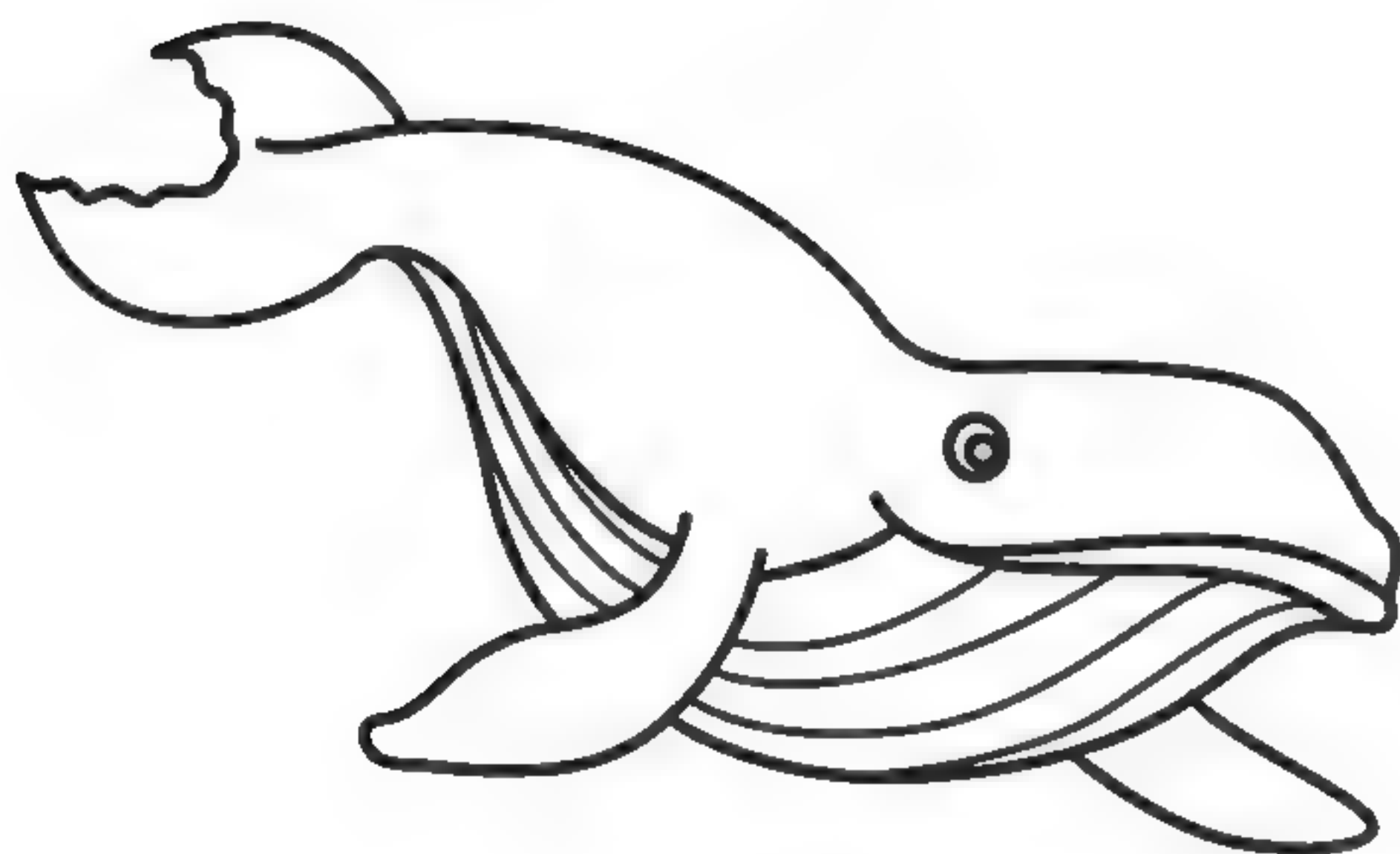
Circle the animals that are invertebrates.



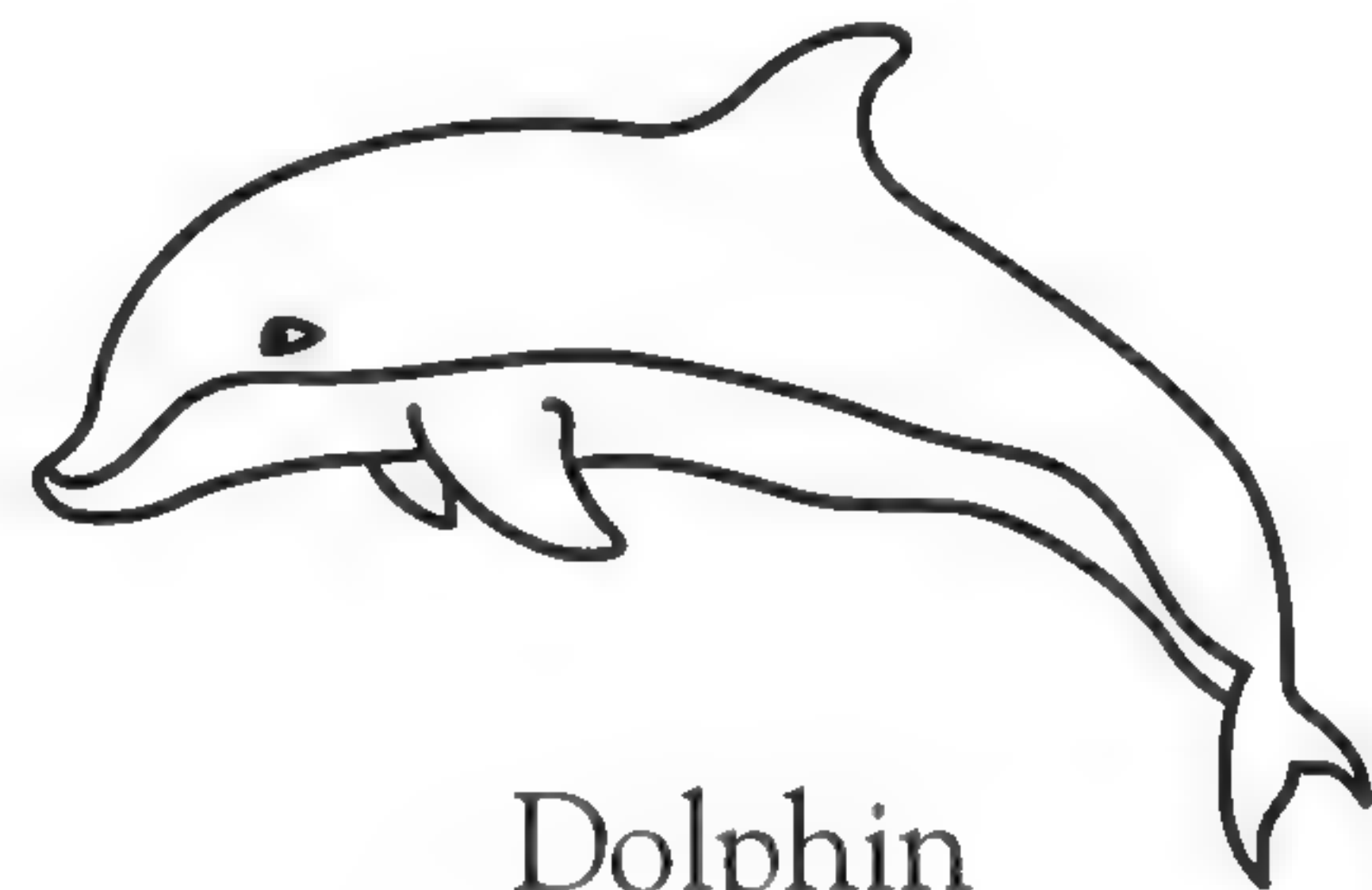
Eel



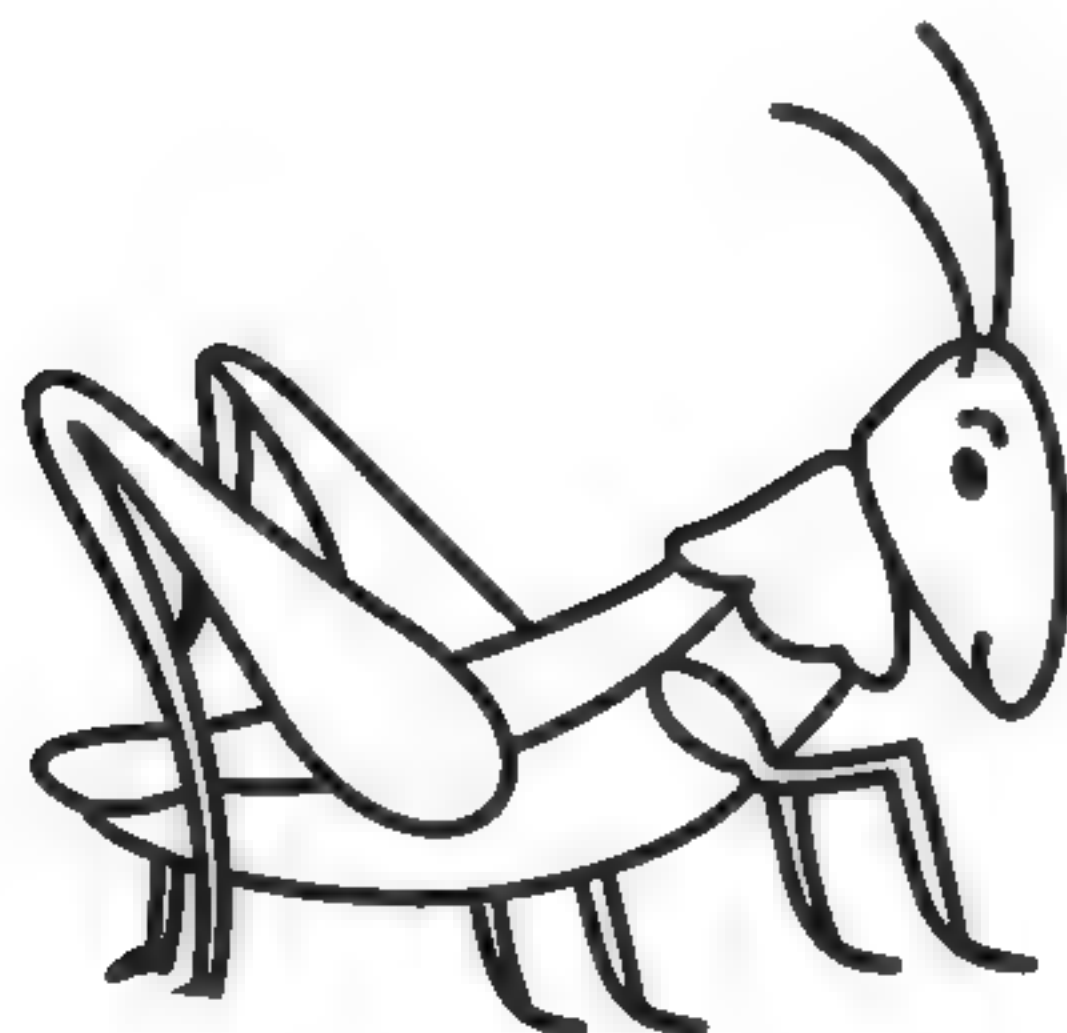
Clam



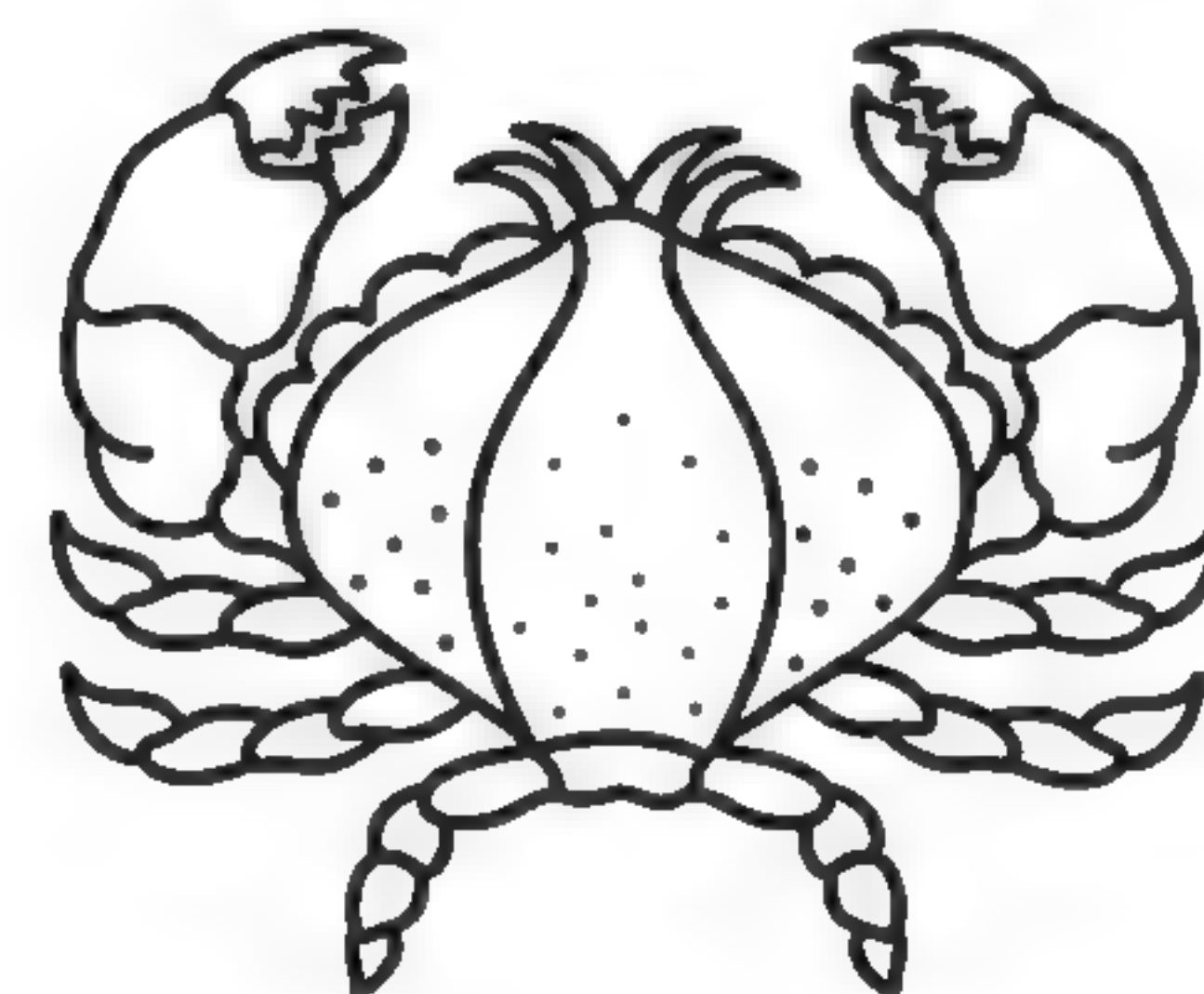
Whale



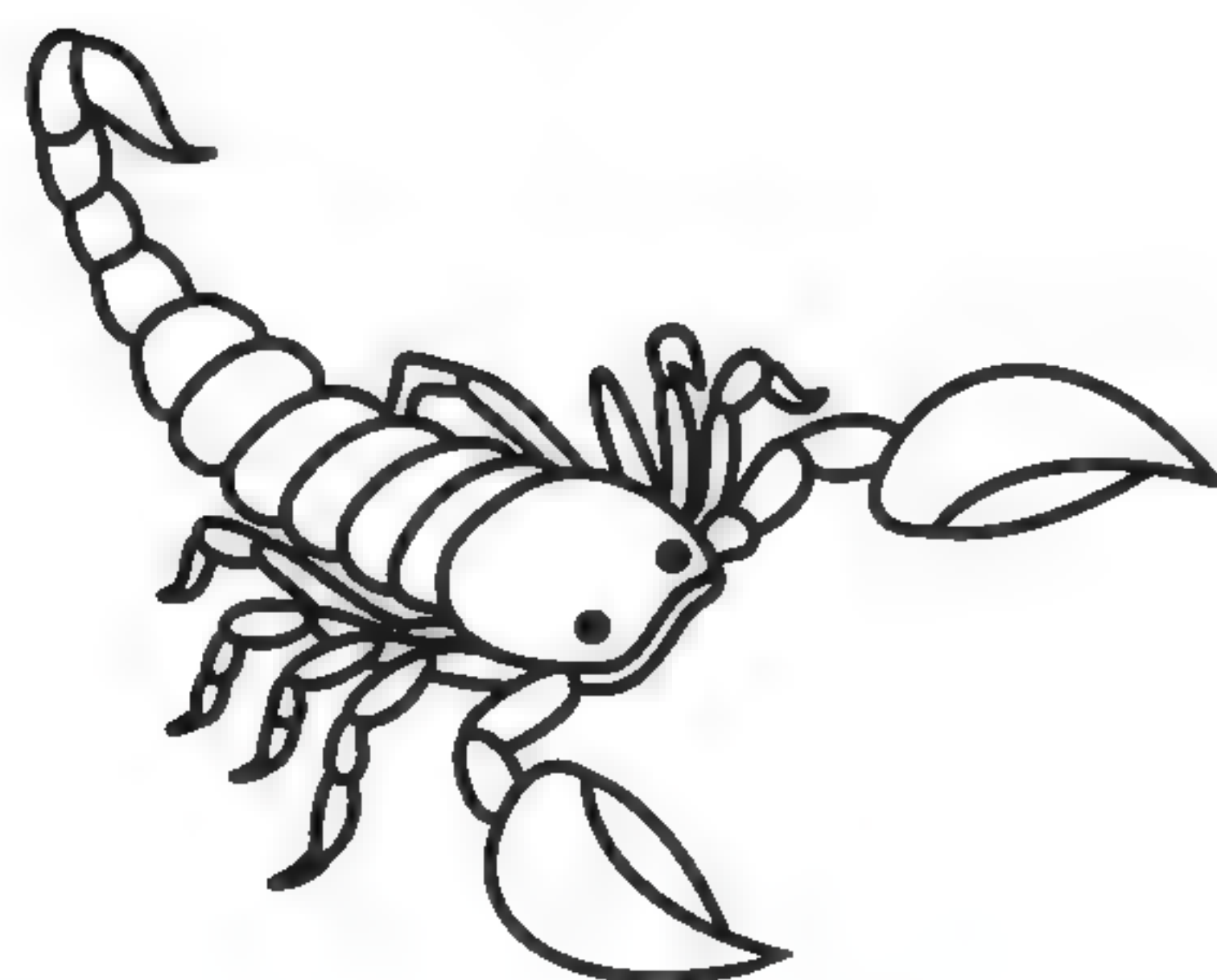
Dolphin



Grasshopper



Crab



Scorpion



Koala



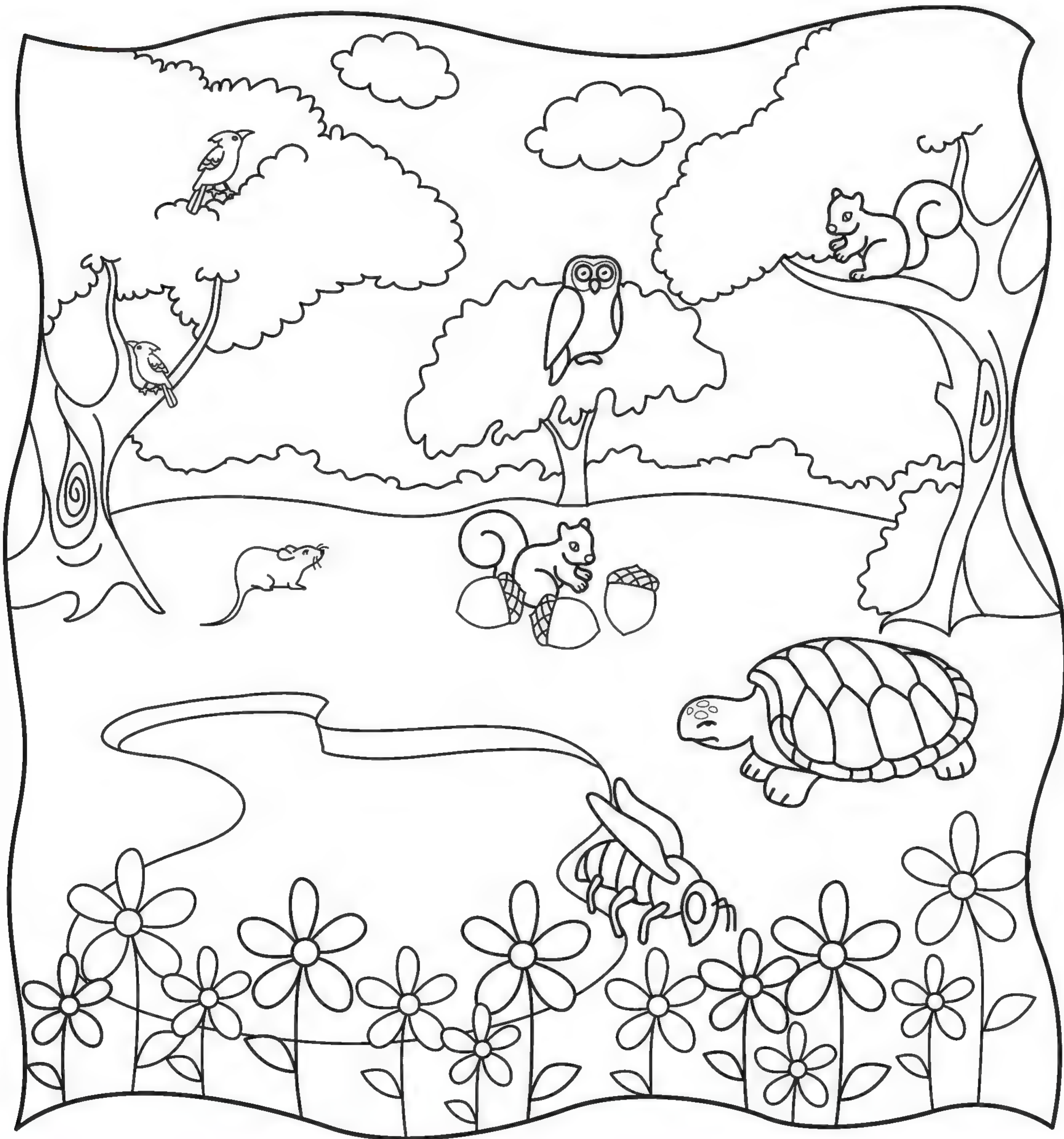


Ecosystem

FACTS

An ecosystem is a community of living things and the environment that they live in.

Look at this picture of a forest ecosystem and draw an arrow from each animal to the part of the ecosystem it relies on.





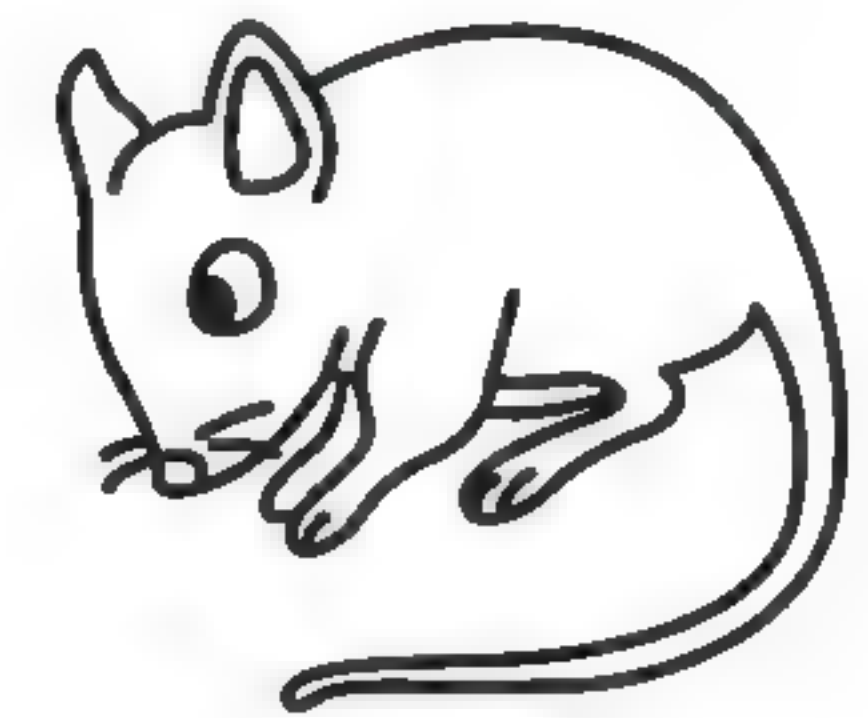
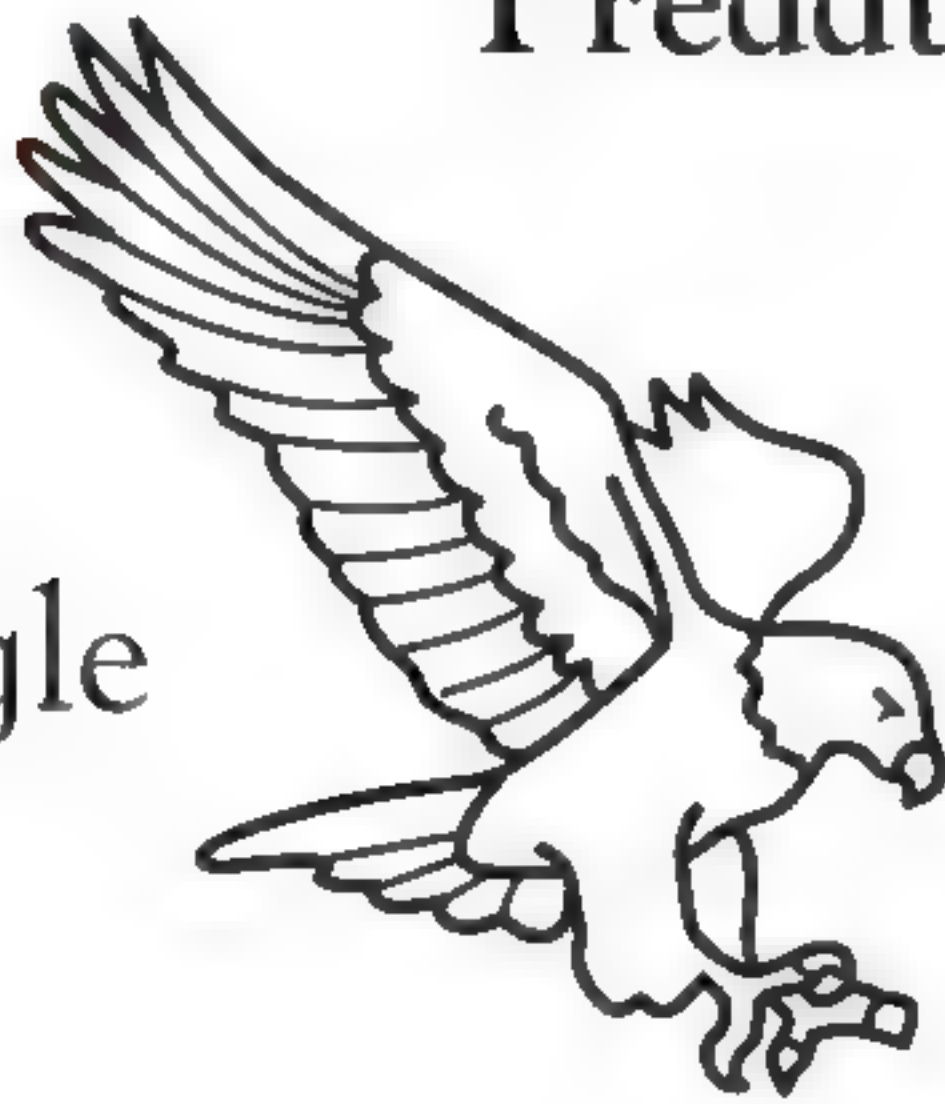
A predator is an animal that kills other animals for food.

Draw a line between each predator and its prey.

Predator

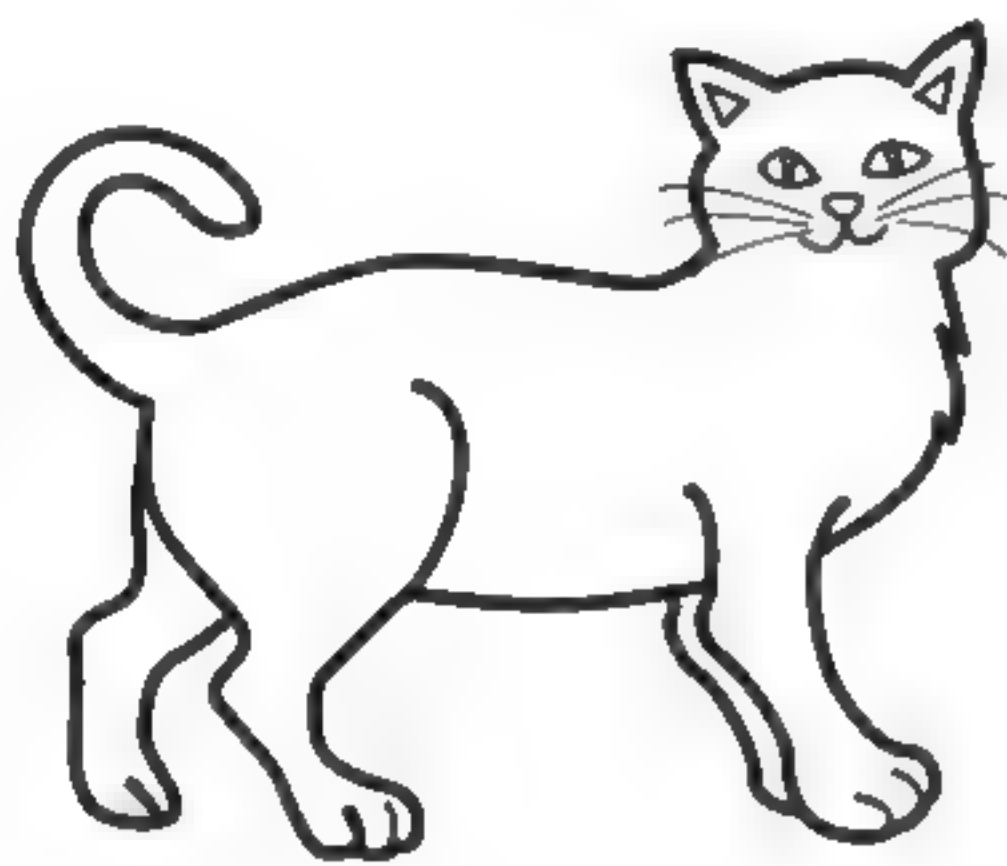
Prey

Bald Eagle



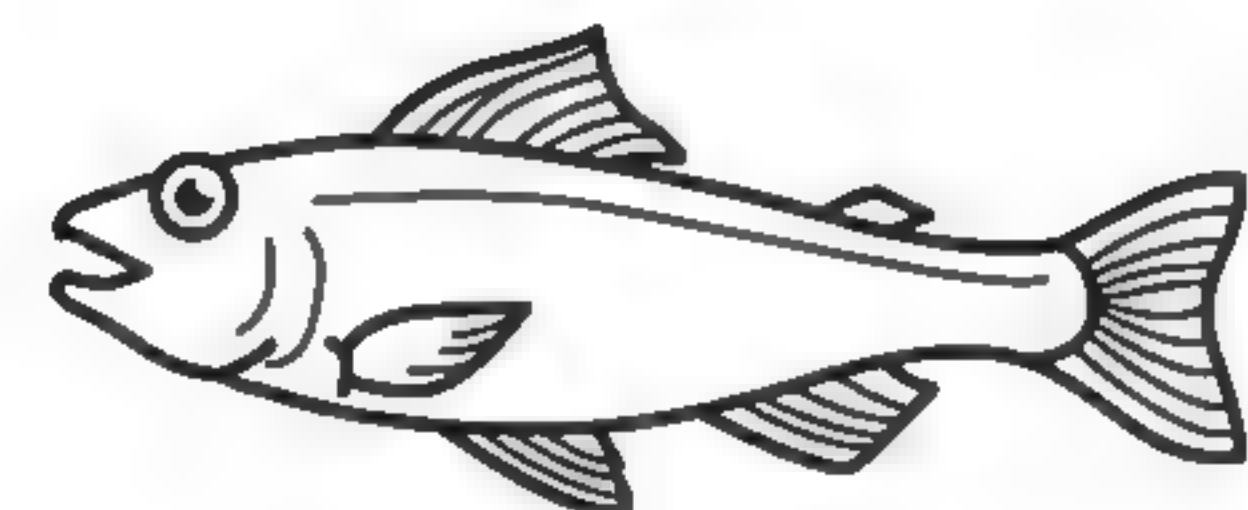
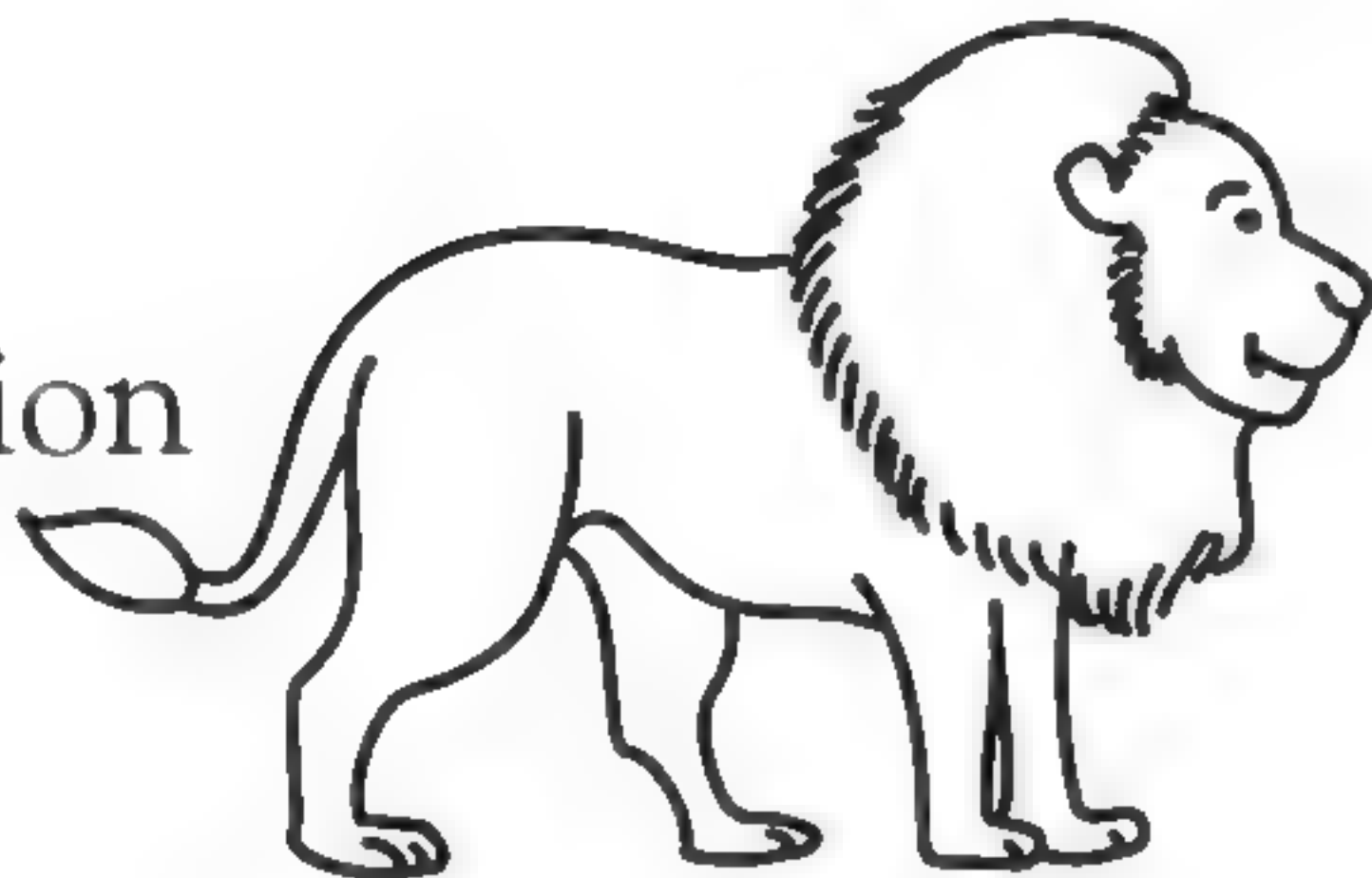
Mouse

Cat



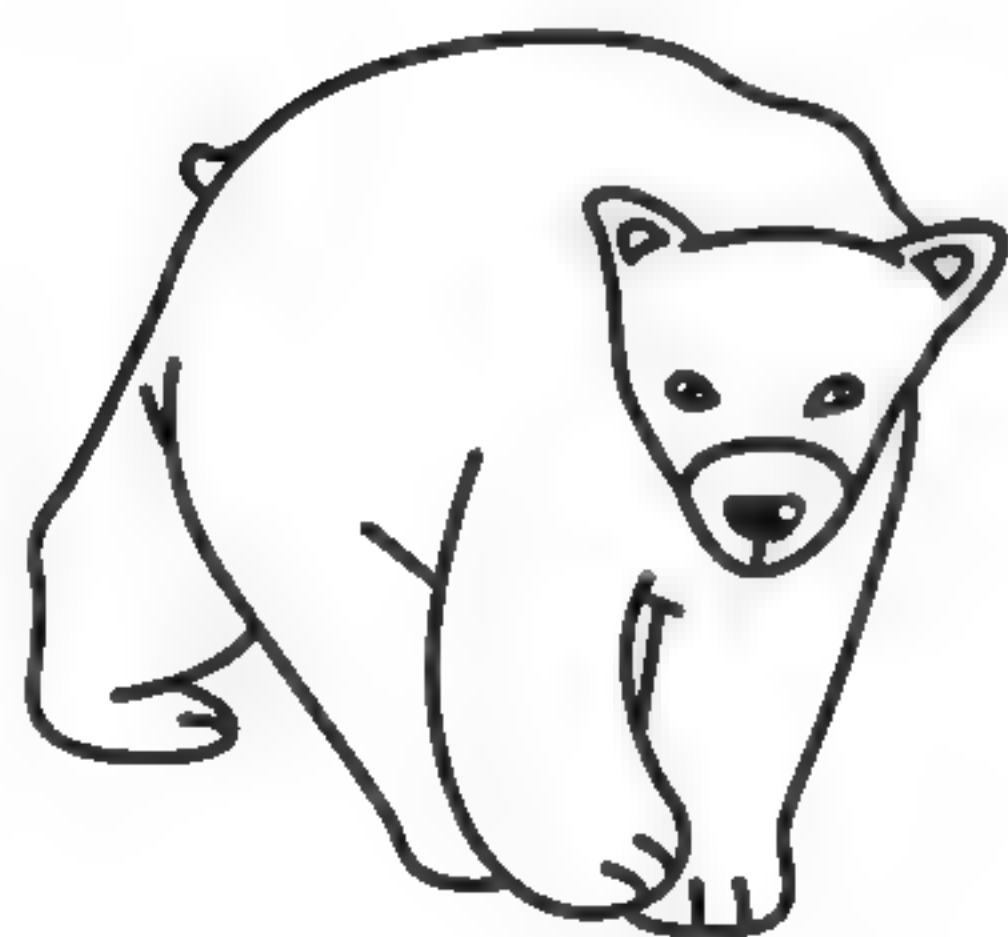
Seal

Lion



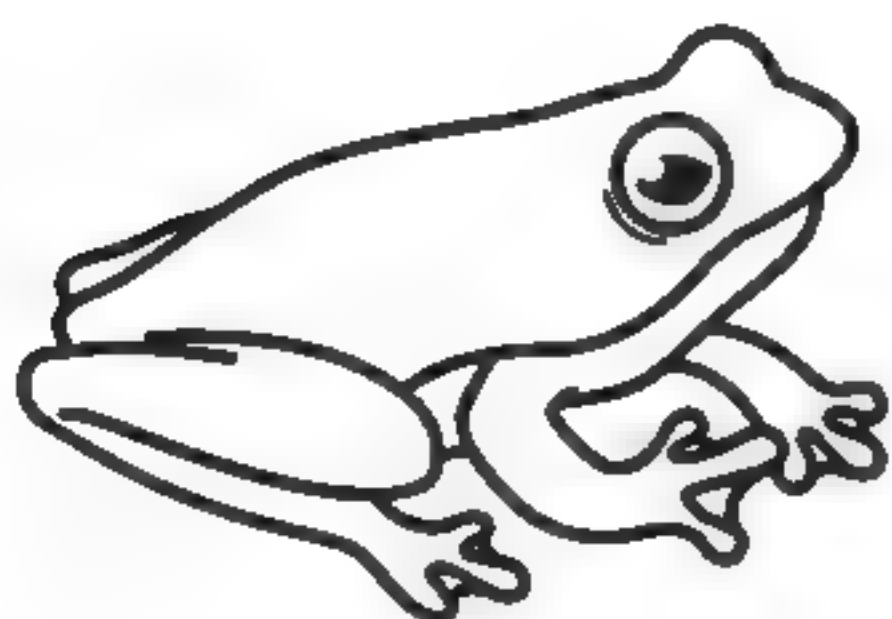
Fish

Polar bear



Dragonfly

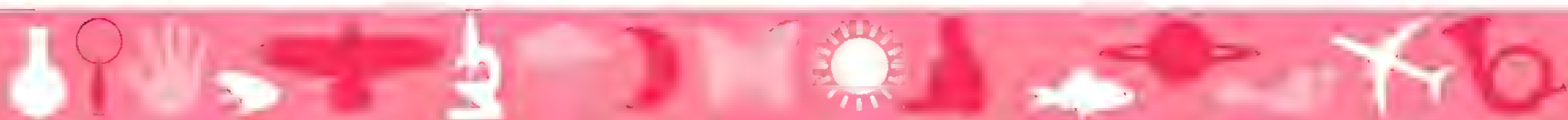
Frog



Zebra

What would happen if hunters killed all the predators in a habitat?

.....



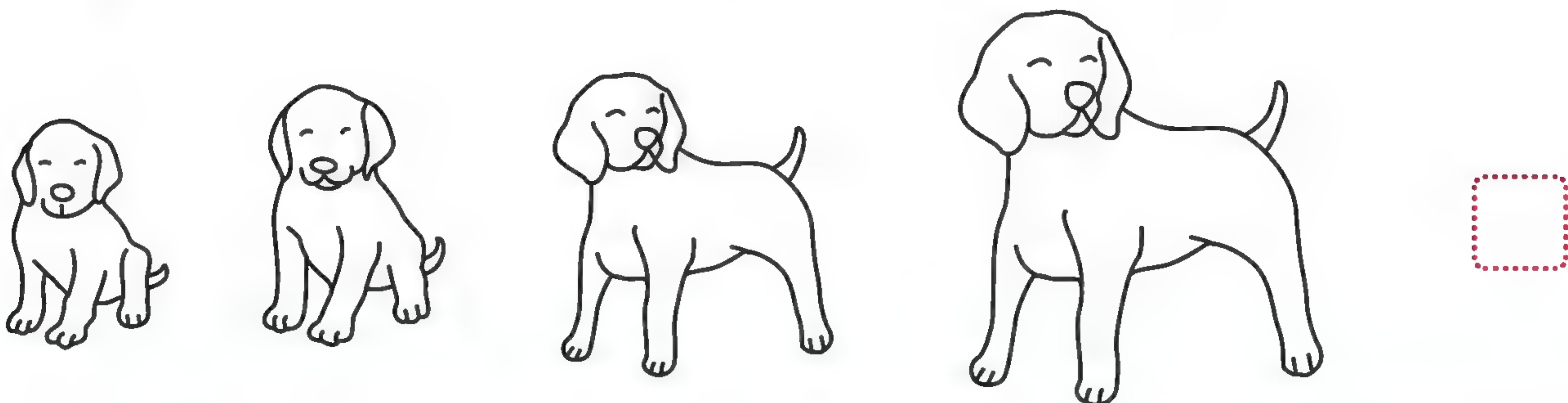
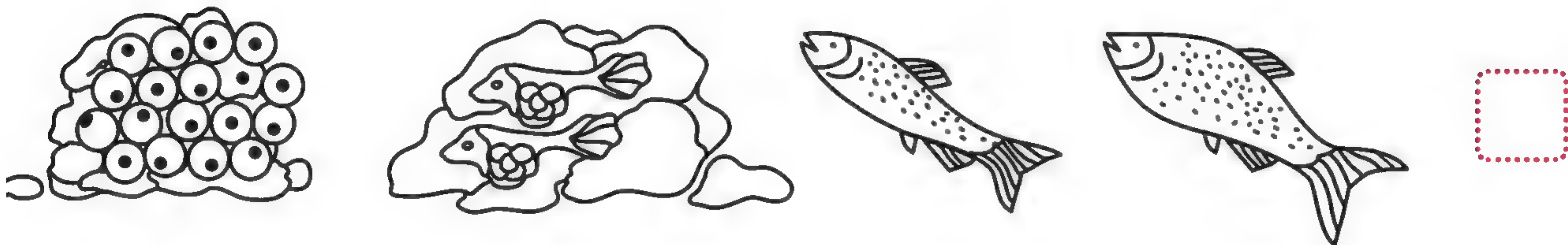
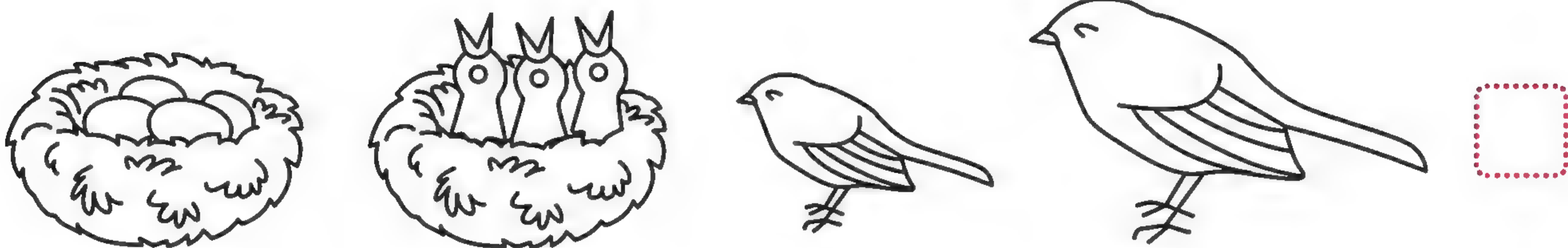
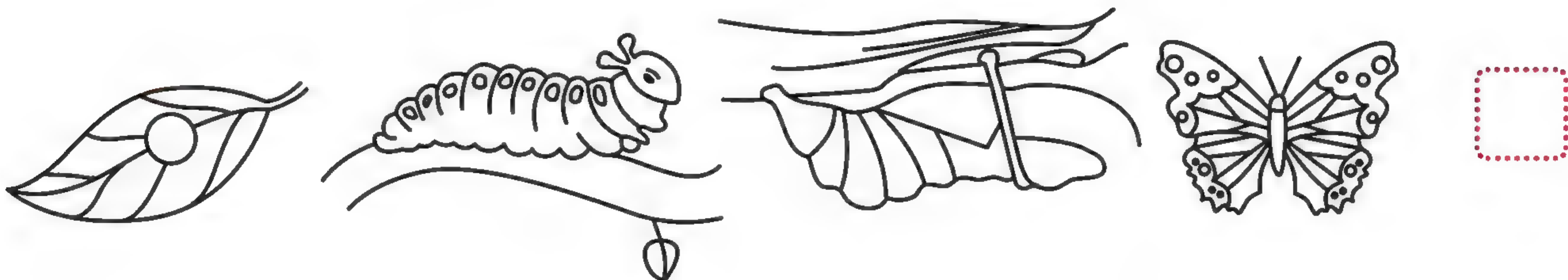


Metamorphosis

FACTS

All animals pass through different stages of life as they grow into adults. But for some animals, they completely change form as they grow. This is called metamorphosis.

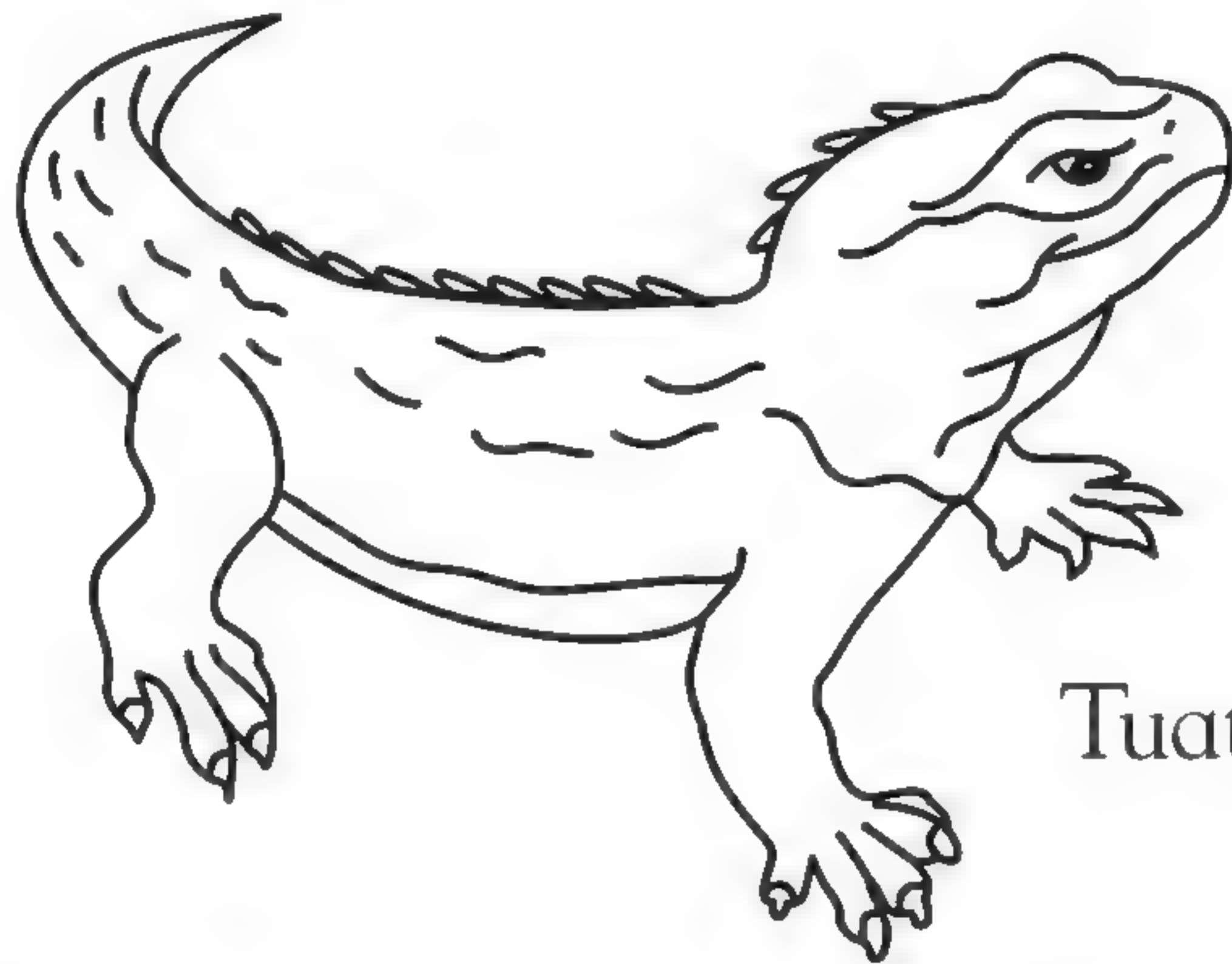
Look at the life cycles of the animals below and write **M** in the boxes of the two that are examples of metamorphosis.





Animals are divided into groups that share key characteristics.

Draw a line between each description of an unusual animal and the details of the animal group it belongs to.



Tuatara

Mammals have fur or hair and feed milk to their young.

The **cassowary** stands almost 6 ft tall. It lays eggs and has feathers.

Reptiles have scaly skin and lay eggs.

The **sugar glider** spreads its body like a kite and glides from tree to tree. It has fur.

Birds lay eggs and have feathers.

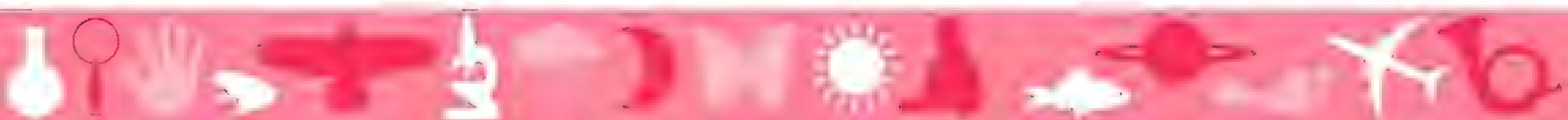
The **aha ha** lays eggs and has wings, but has no backbone.

Fish have scales, lay eggs, and have gills that enable them to breathe in water.

The **tuatara** is scaly, lays eggs, and can live to be more than 100 years old.

Insects have no backbone. They lay eggs, have six legs, and many have wings.

The **humuhumunukunukuapua'a** is brightly colored, grunts like a pig, and has gills.





Marsupials

FACTS

Marsupials are a special group of mammals that raise their young in a pouch. Most marsupials live in Australia, where kangaroos, wallabies, wombats, and koalas are found. Several marsupials live in South America, but just one in North America—the opossum.

Use the words in the box to complete the sentences.

Australia

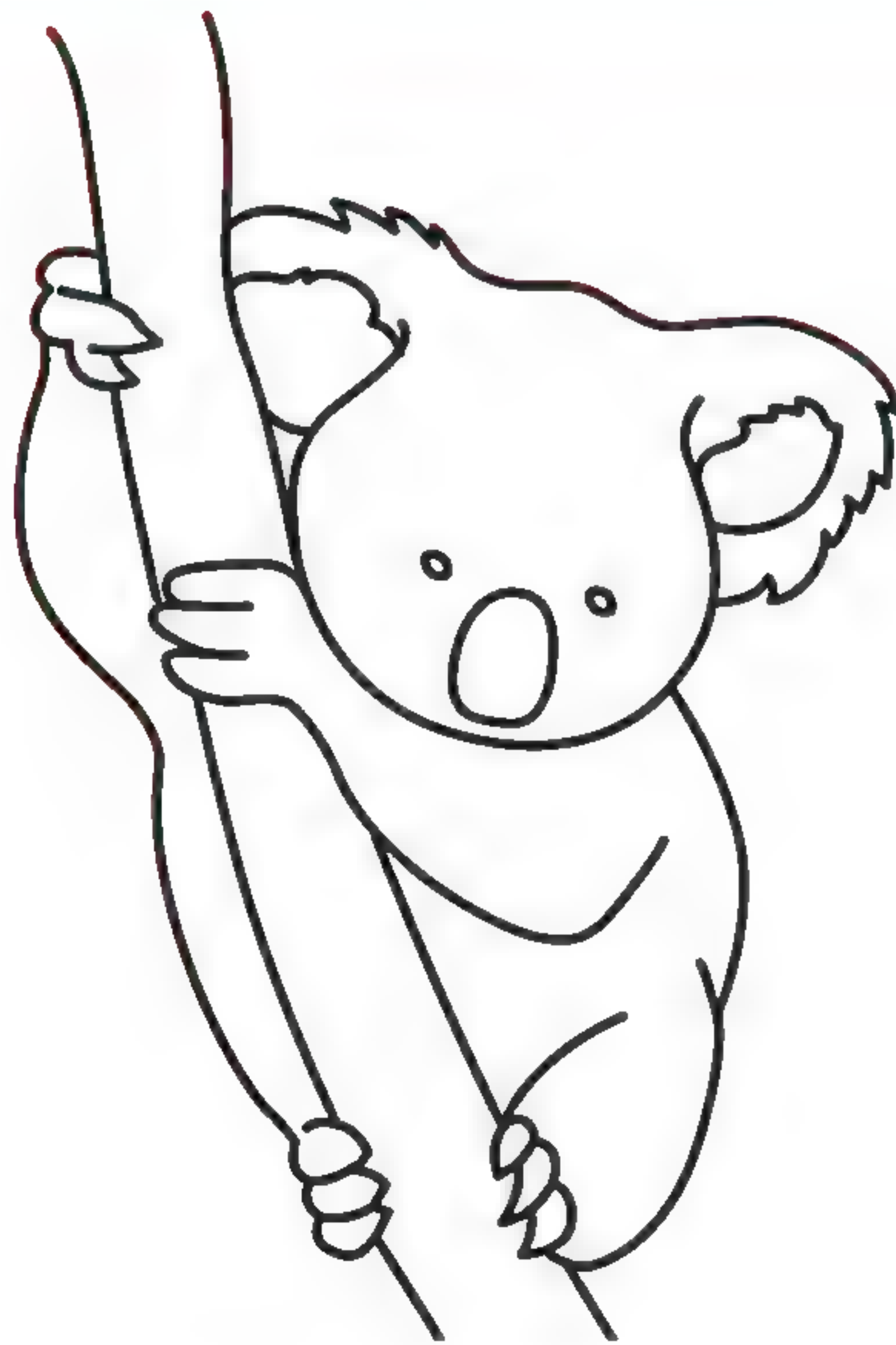
Kangaroo

Koala

Milk

North America

Pouch



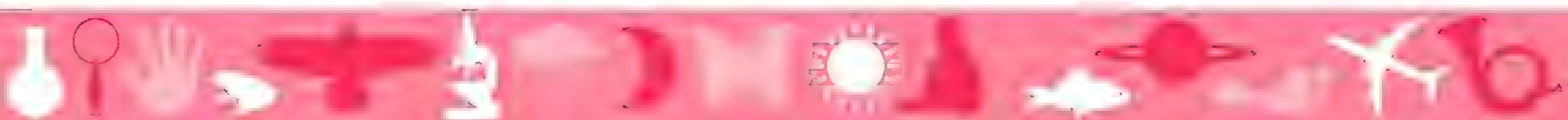
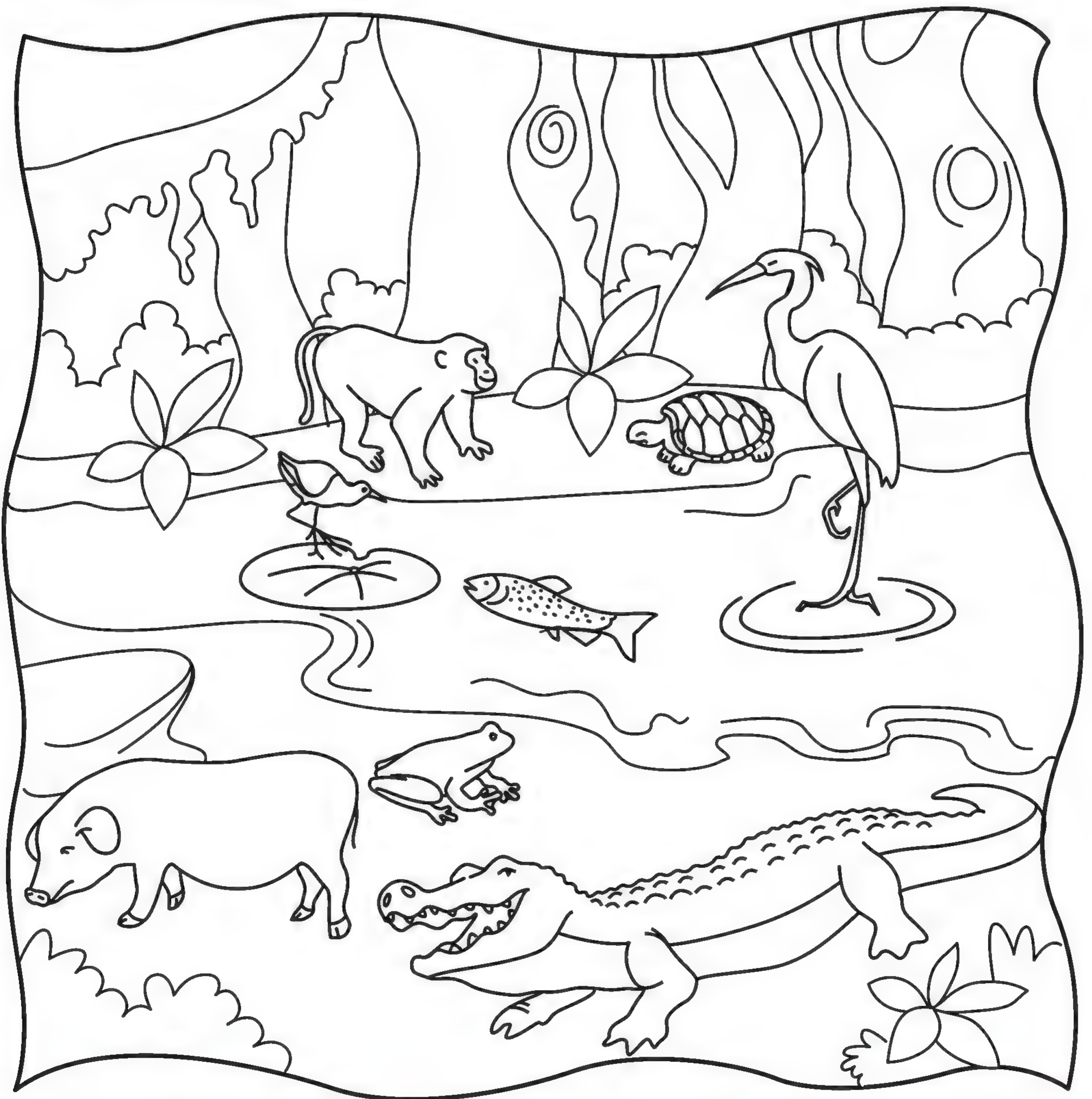
1. Marsupials are unusual mammals because they carry their young in a
2. Like most mammals, marsupials have fur and feed their young on
3. Most marsupials live in
4. The opossum is the only marsupial in
5. The biggest marsupial is the
6. Although it is often called a bear by mistake, the is in fact a marsupial.





A wetland is a flooded area that is usually a mix of open water and areas of dense vegetation. It is a habitat rich in wildlife. The water is full of swimming animals, and the trees and reeds are home to the many birds that feed off them.

Look at the animals in the picture and think about how they are adapted to living in a wetland habitat. Circle the two animals that do not live there.





Photosynthesis

FACTS

Plants use the energy from sunlight to make food from carbon dioxide and water in a process called photosynthesis. Most food is made in the leaves.

Use the words in the box to complete the sentences.

Carbon dioxide

Chlorophyll

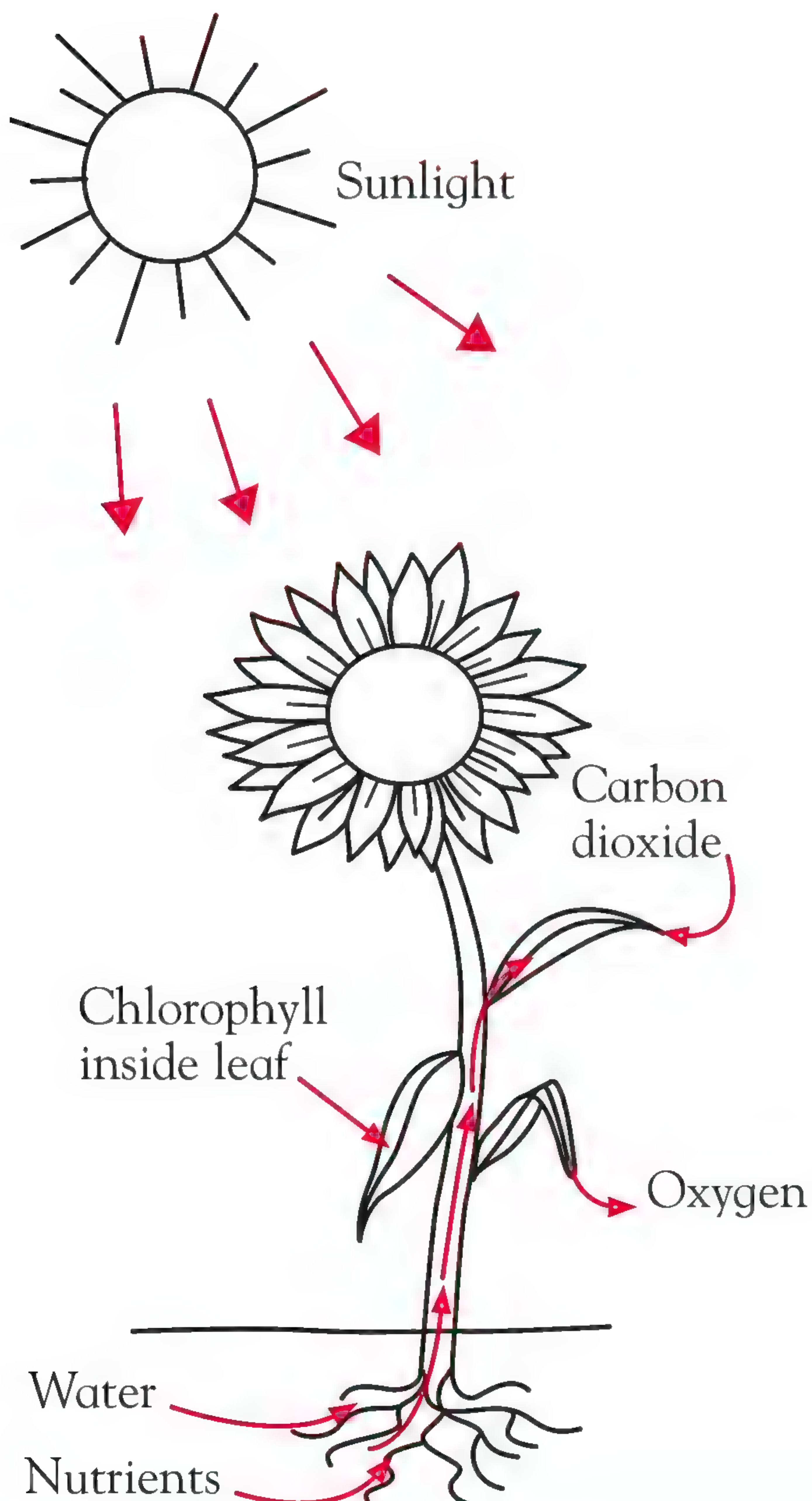
Food

Nutrients

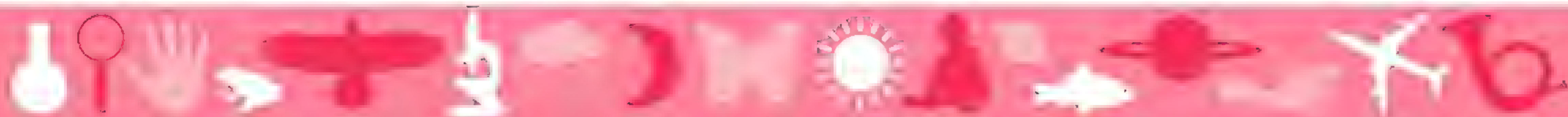
Oxygen

Sunlight

Water



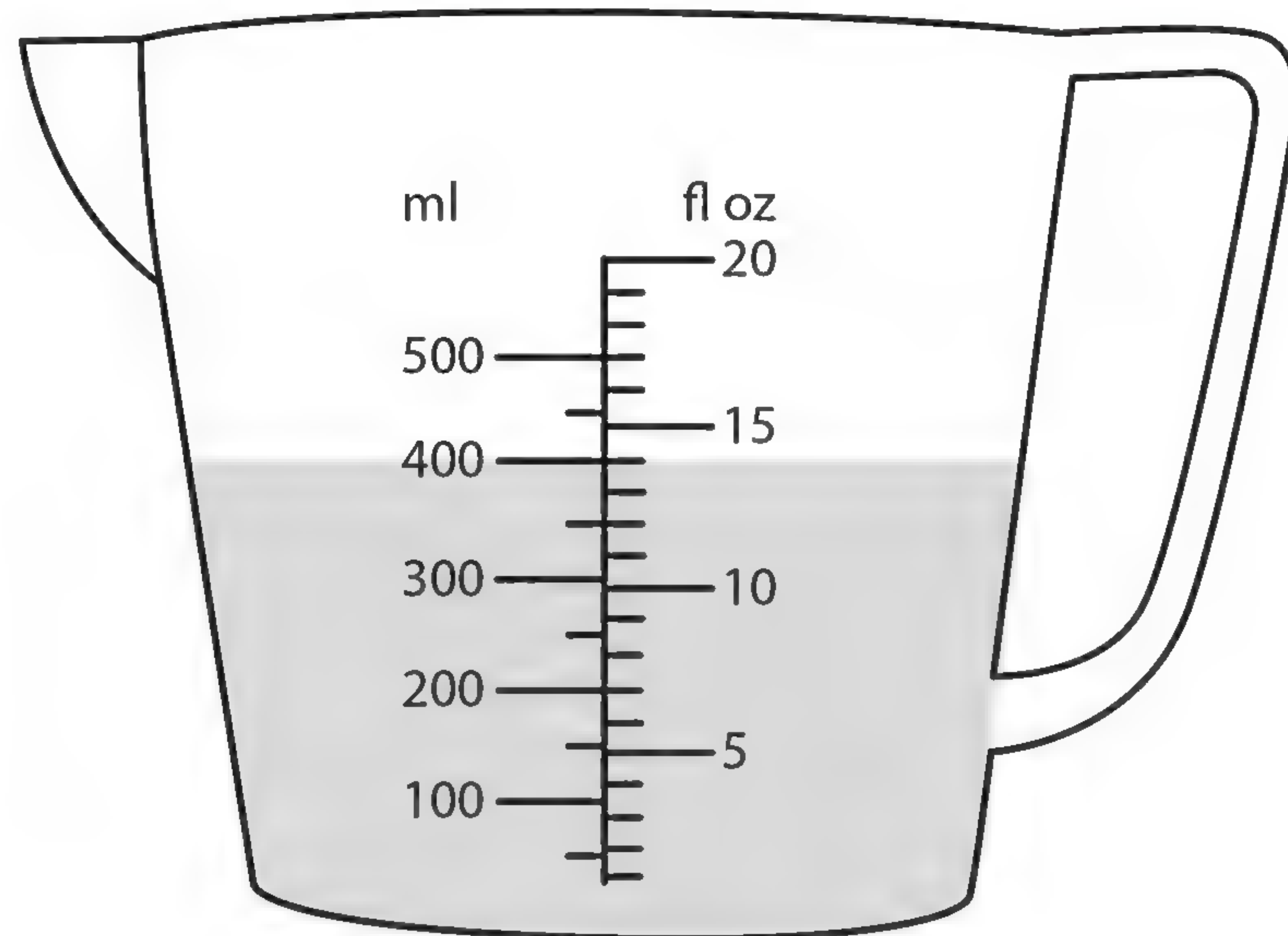
1. Plants use energy from to make food.
2. A green substance in leaves, called, traps the energy.
3. enters the plant through tiny holes on the underside of the leaves.
4. The roots supply and
5. travels from the leaf to all parts of the plant.
6. is released from the leaf through holes in the underside.



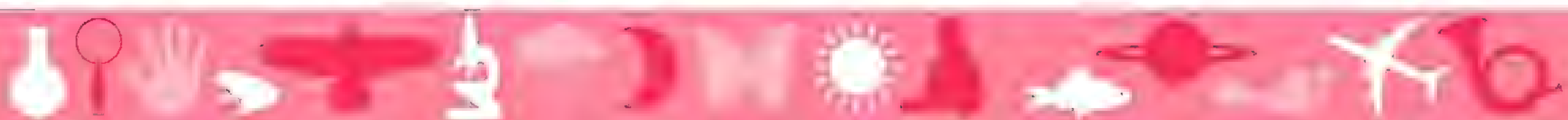


Liquids can be measured in pints and fluid ounces (fl oz), or liters and milliliters (ml).

Study the measuring cup of water and then answer the questions.



1. How much water is in the measuring cup, in milliliters?
2. How much water is in the measuring cup, in fluid ounces?
3. How many fluid ounces is 200 ml equal to?
4. One pint is 20 fl oz and half a pint is 10 fl oz.
How many milliliters is 10 fl oz?
5. One liter is 1,000 ml, so half a liter is 500 ml.
How many fluid ounces is 500 ml?
6. How many milliliters is 5 fl oz?





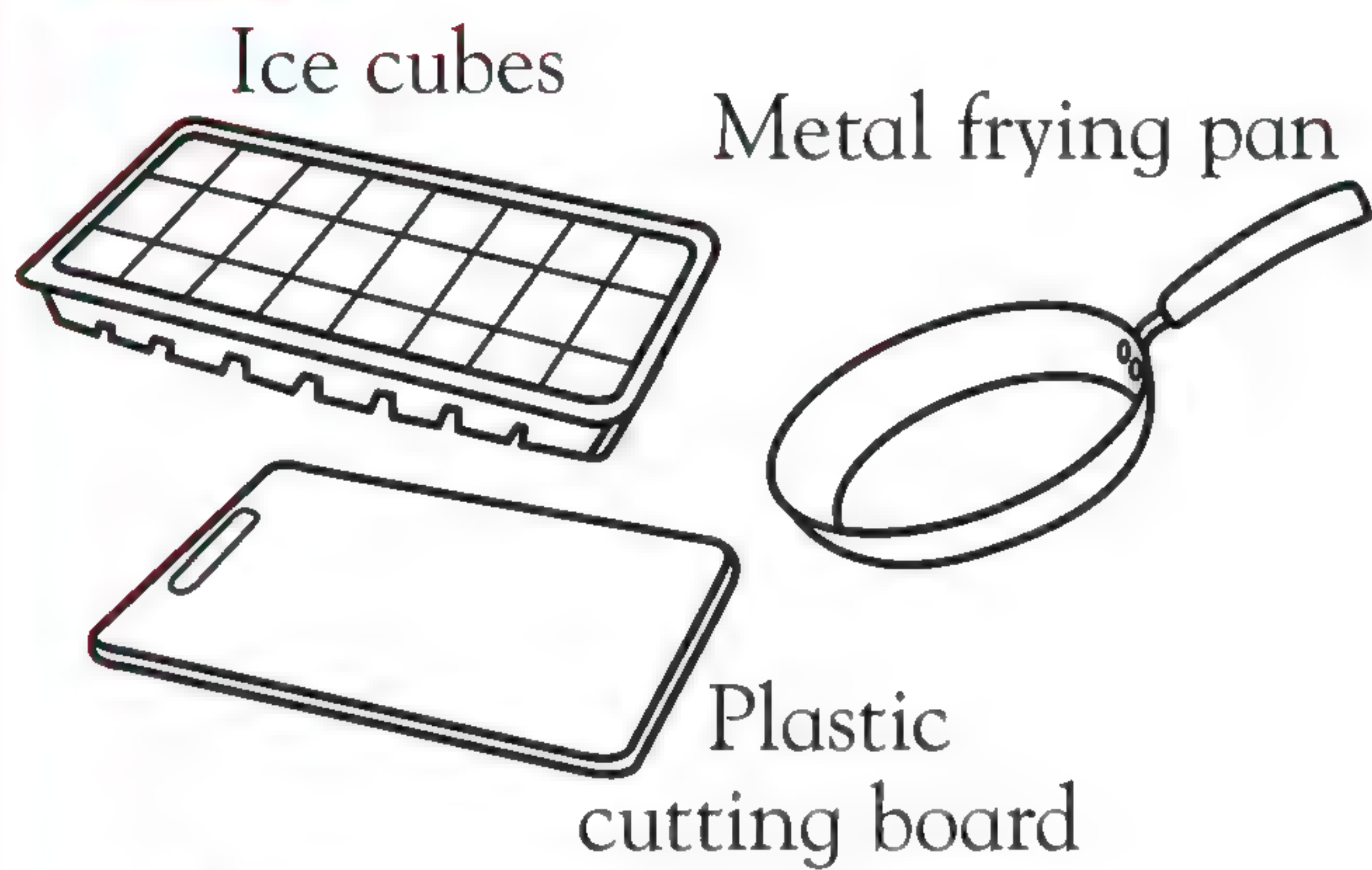
Conduction

FACTS

Conduction is one way that heat moves through a material. Some materials, like metals such as steel and aluminum, conduct heat well. Other materials do not conduct heat well.

TEST

What You Need:



What To Do:

1. Press your hand against the surface of the frying pan and then the surface of the cutting
2. Ask yourself what would happen if you placed an ice cube on both surfaces? Would the ice cube on the board melt first, or the ice cube in the pan? Make a prediction and put a check (✓) on the table next to the surface you think will melt the ice cube quicker.
3. Test your prediction. Place an ice cube on each surface and observe what happens.

RESULT

Material	How Does it Feel?	Predicted Result	Result
Metal pan			
Plastic board			

Look at the table and explain the result.

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A thermometer is an instrument used to measure temperature. This may be measured in degrees Fahrenheit ($^{\circ}\text{F}$), or degrees Celcius ($^{\circ}\text{C}$).

Study the thermometer and then answer the questions.

1. What is the temperature reading in degrees Fahrenheit?

2. What is the temperature reading in degrees Celsius?

3. How many degrees Fahrenheit is 40°C ?

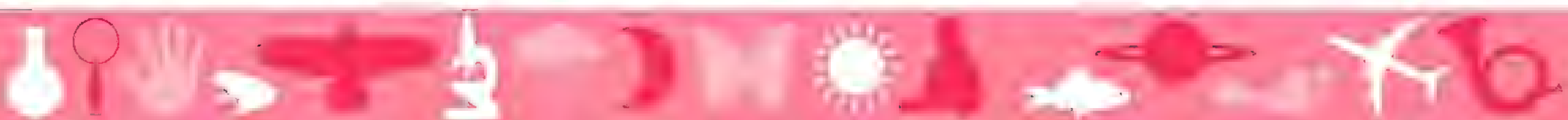
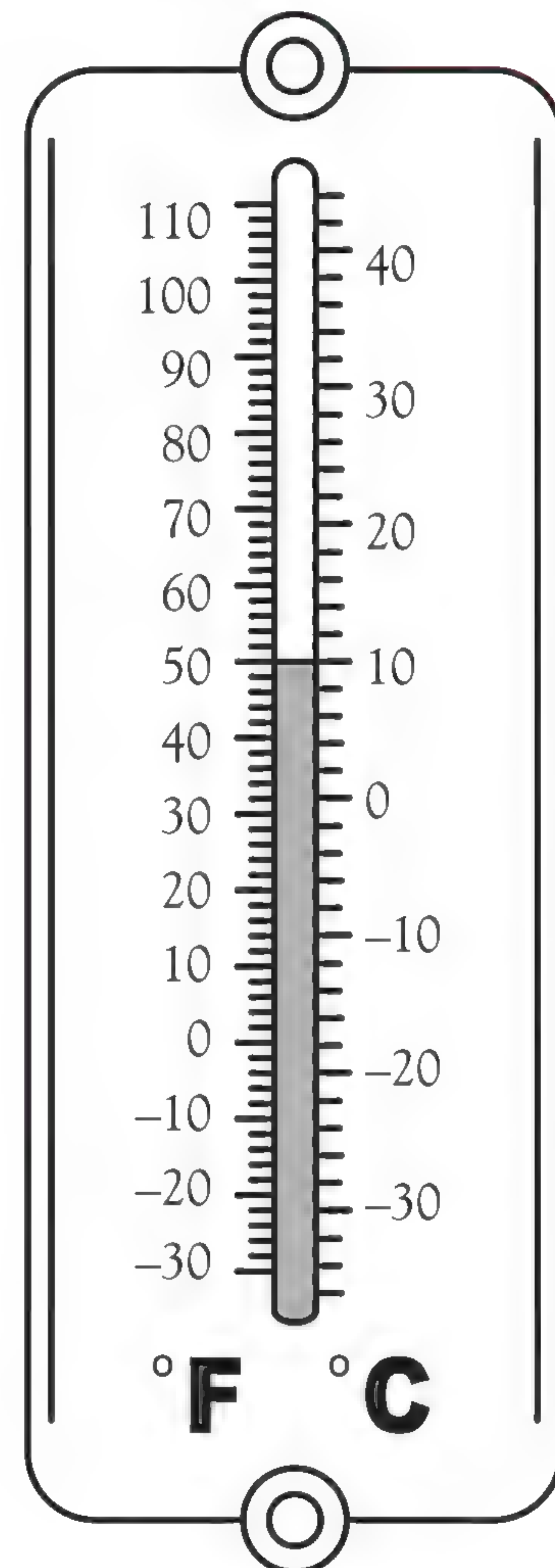
4. How many degrees Celcius is 100°F equal to?

5. How many degrees Celcius is -22°F equal to?

6. How many degrees Fahrenheit is 0°C equal to?

7. How many degrees Celcius is 0°F equal to?

8. How many degrees Fahrenheit is 20°C equal to?



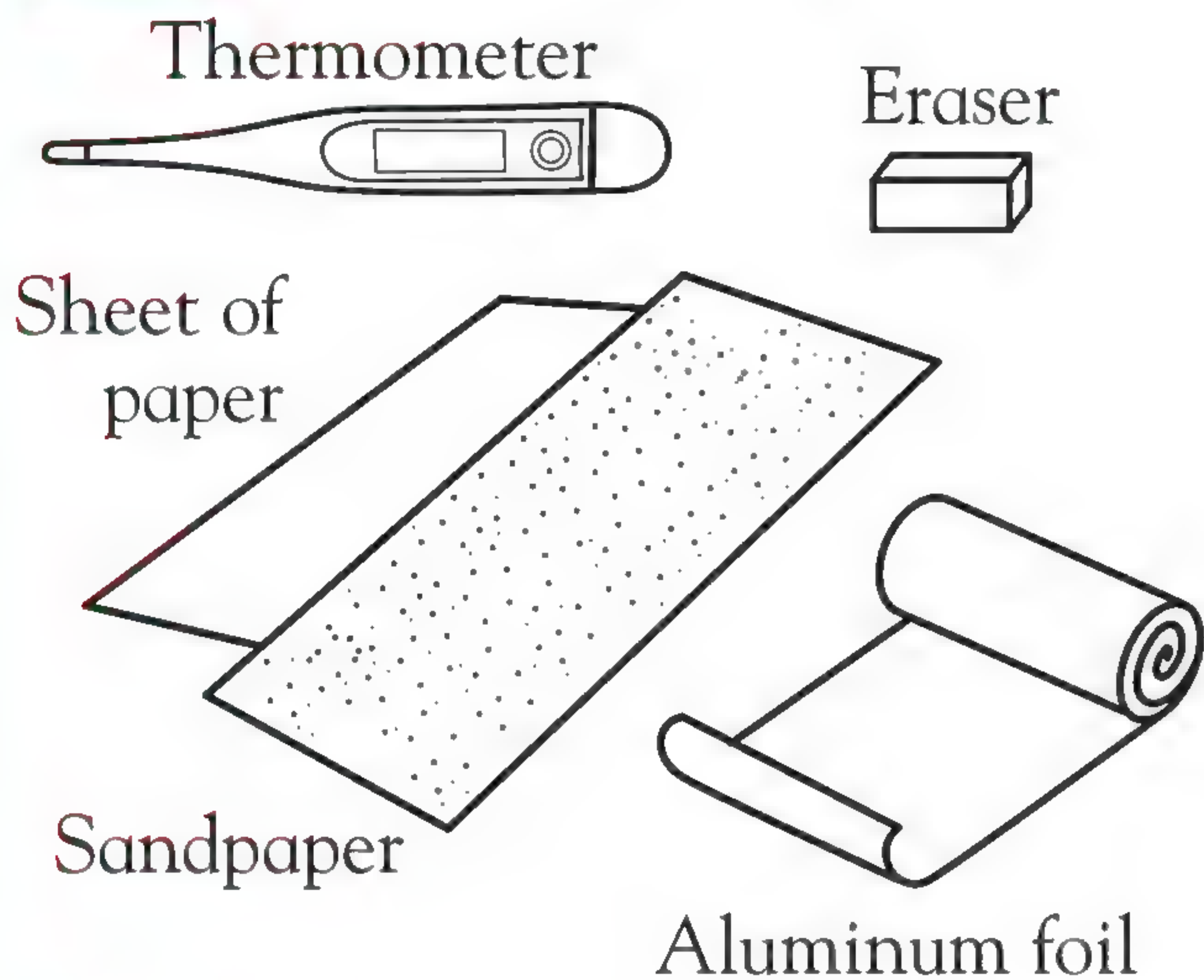


Friction

FACTS

Friction is a force that occurs when the surfaces of two objects rub against each other. It produces heat.

TEST What You Need:



What To Do:

1. Gently press the eraser against the bulb of the thermometer and hold it there for 15 seconds. Record the temperature in the table below.
2. One at a time, rub the eraser against the surface of each of the papers and the foil, and measure the temperature of the eraser.

RESULT

Predict what you think will happen to the temperature of the eraser when you rub it against the surfaces of the other materials.

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Enter your results in the table.

Surface	Temperature
Eraser	
Rubbed on paper	
Rubbed on sandpaper	
Rubbed on foil	

Explain the results in the table.

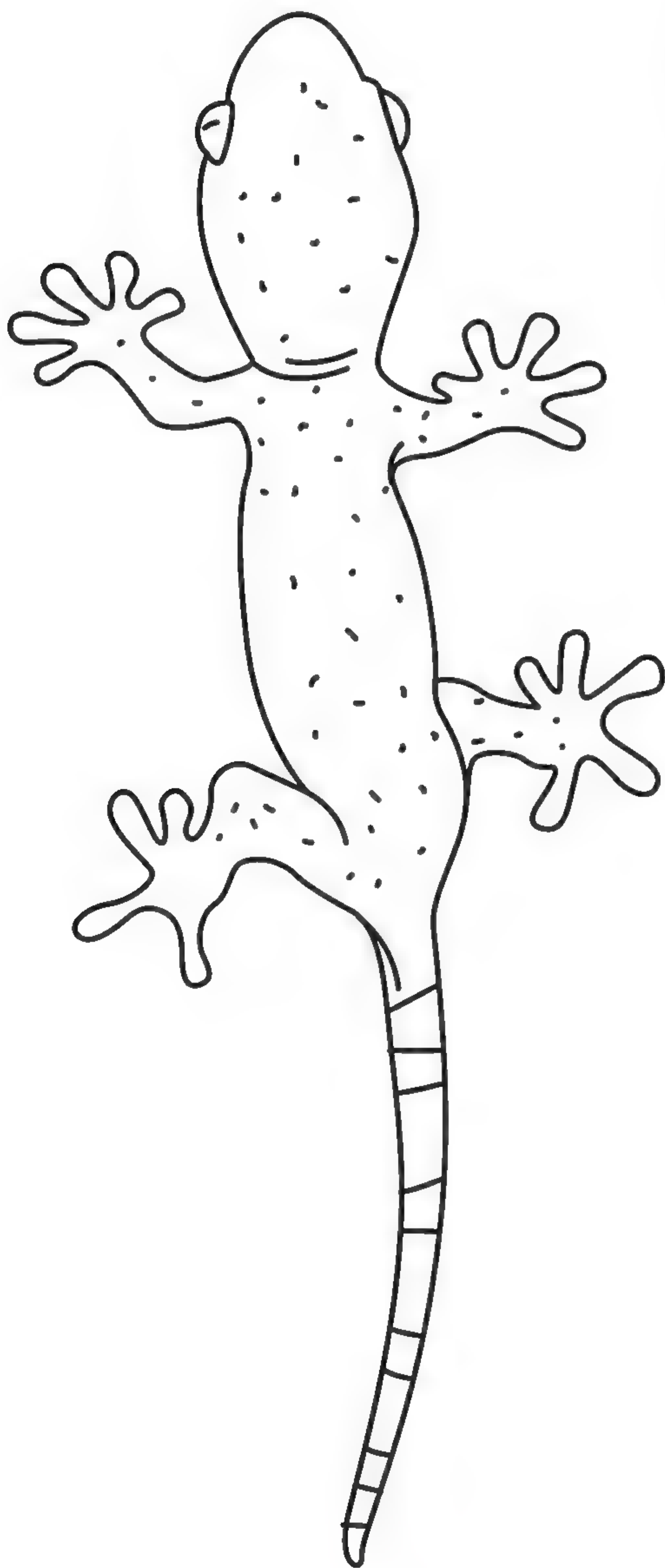
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The size of an object—its height, width, or length, can be measured in feet (ft) and inches (in.), or in meters (m), centimeters (cm), and millimeters (mm). One foot equals 12 in. One meter equals 100 cm, or 1,000 mm.

Study the ruler and then answer the questions.



1. How long is the lizard in centimeters?

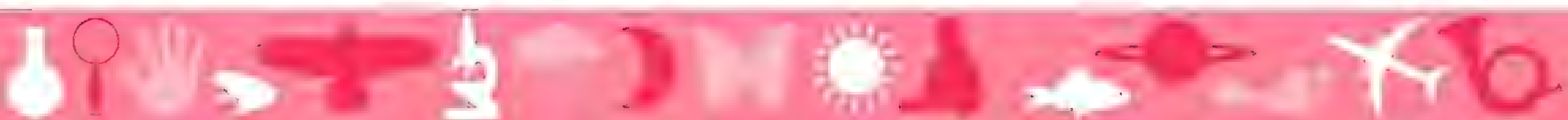
2. How long is the lizard in inches?

3. How many inches are equal to 9 cm?

4. How many centimeters are there in 3 in.?

5. How many millimeters are there in 1 in.?

6. How many inches are equal to 102 mm?





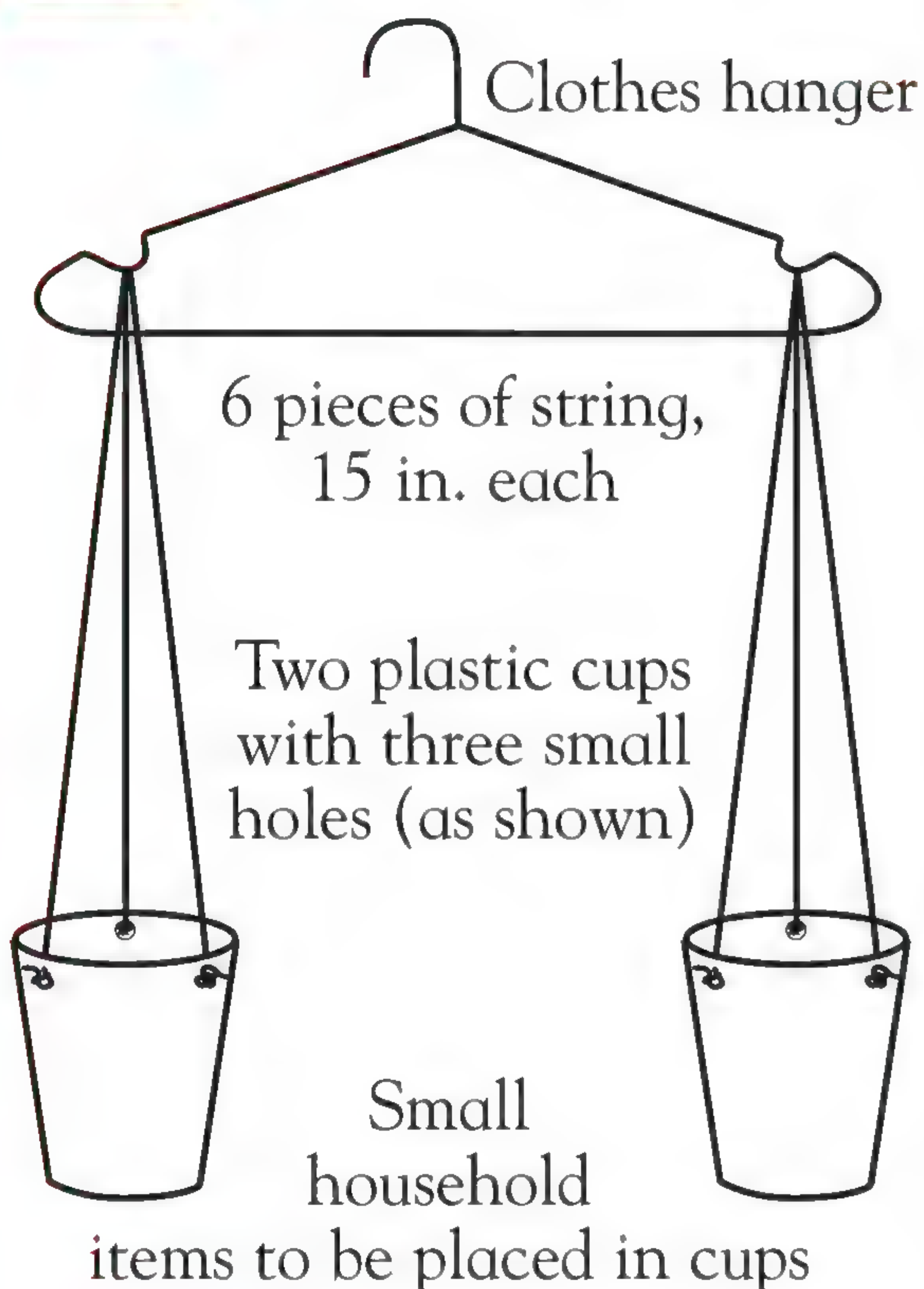
Mass

FACTS

Matter is the name used to describe all the different material that makes up the universe. The amount of matter in an object is called its mass. The amount of space that matter takes up is called its volume.

TEST

What You Need:



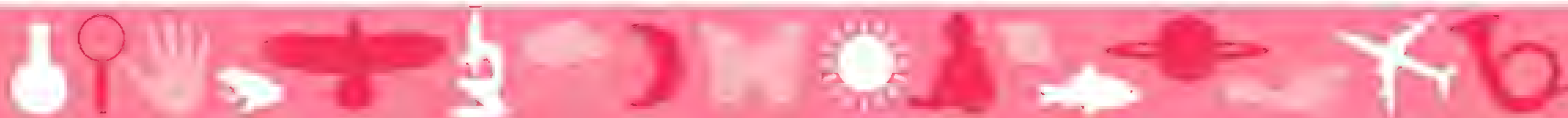
What To Do:

1. Thread one end of a 15 in. length of string through a hole in one cup and tie it. Repeat for the other two holes.
2. Tie together the loose ends of the three pieces of string, then hang from one end of the hanger.
3. Repeat these steps for the other cup to make a balance.
4. Hang the balance from a doorknob. The bottom of the cups should be level, and hover above the floor.
5. Add items to each cup and compare their mass. An item with greater mass will weigh a cup down more than an item with less mass.

RESULT

Predict which items have more mass. Were your predictions correct?

Item in Left Cup	Item in Right Cup	Prediction of Result	Result





An element is a natural substance that cannot be broken down into any simpler ingredients. Scientists have discovered more than 100 elements in the universe.

Name the element found in each of the objects below, using the words in the box.

Aluminum

Carbon

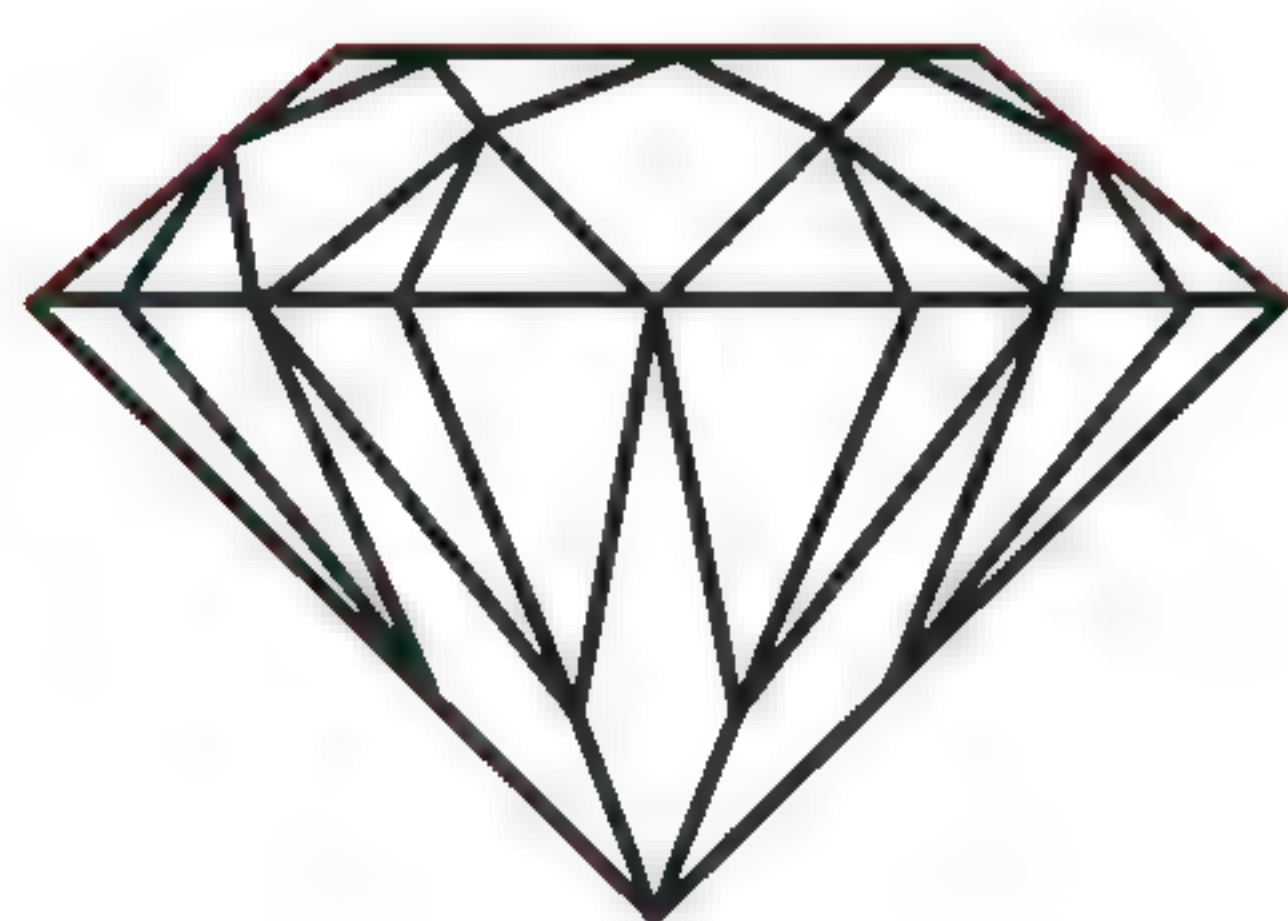
Gold

Helium

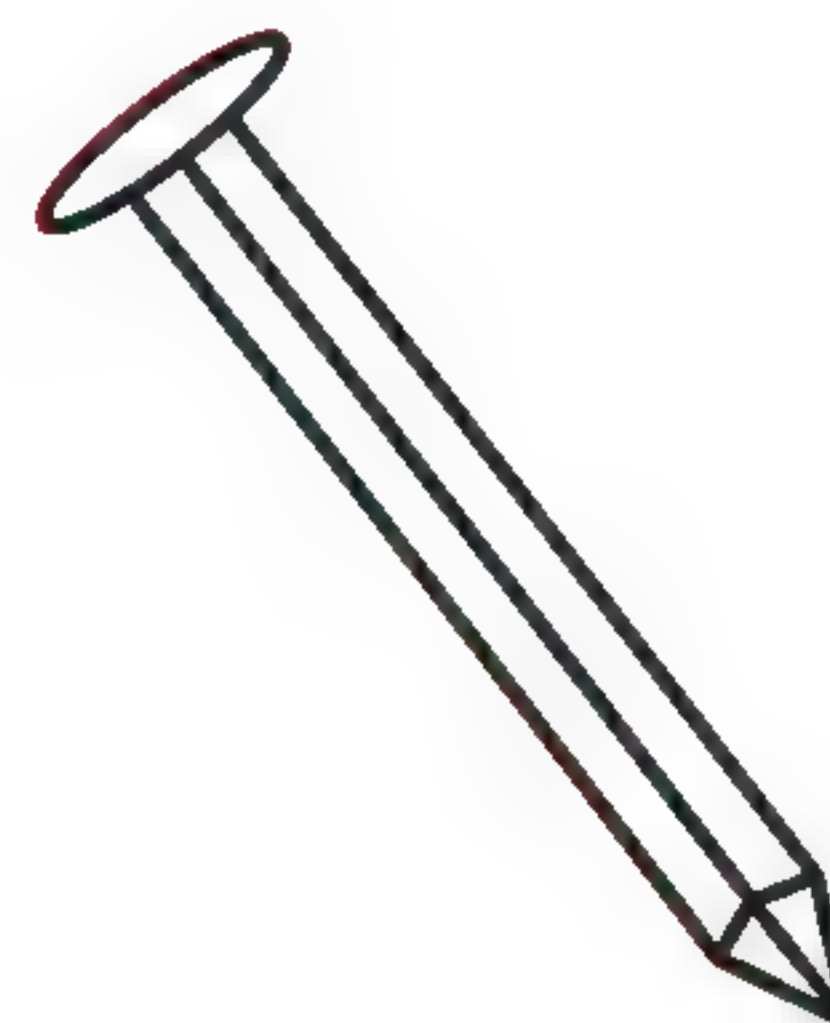
Iron

Mercury

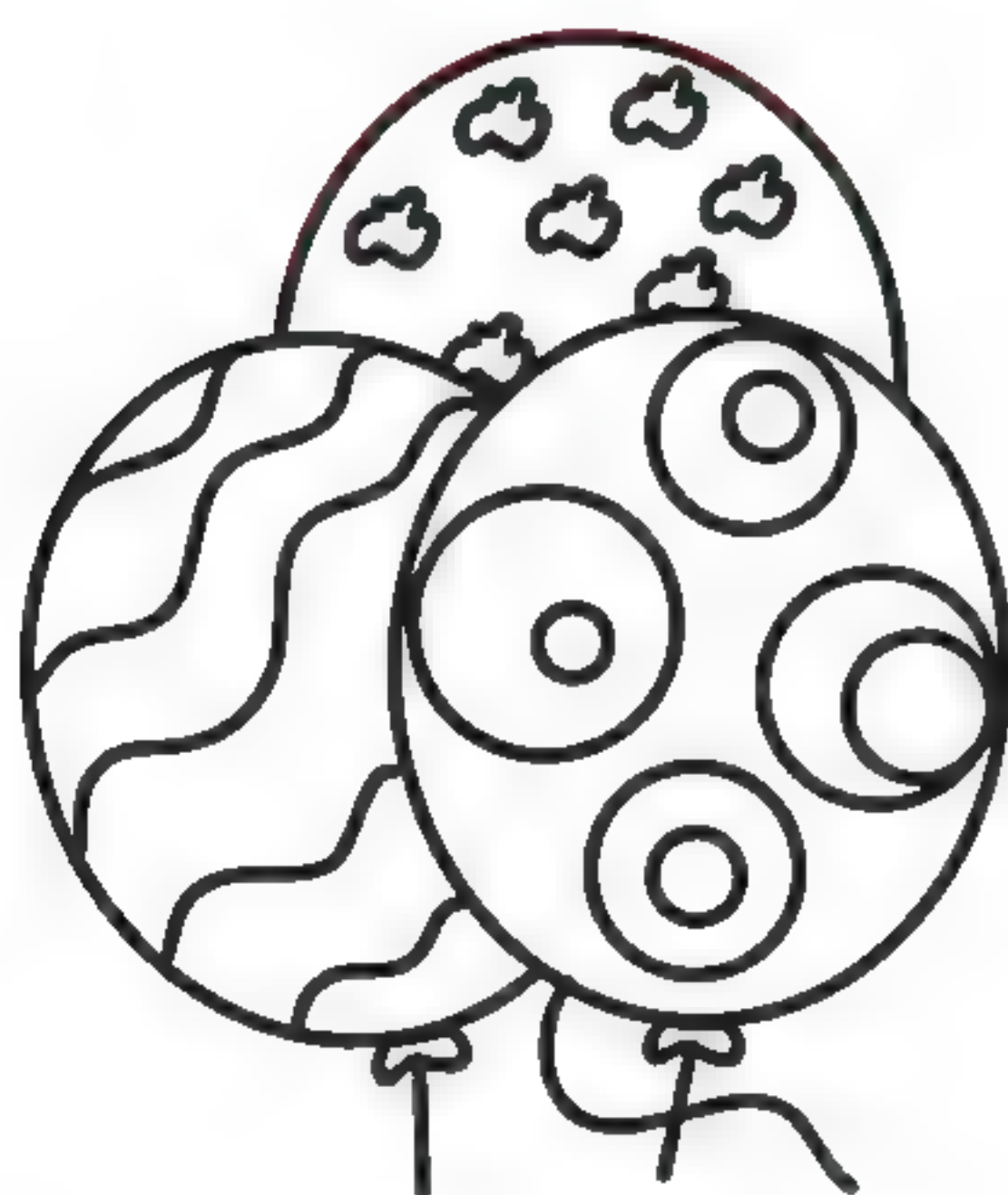
Silver



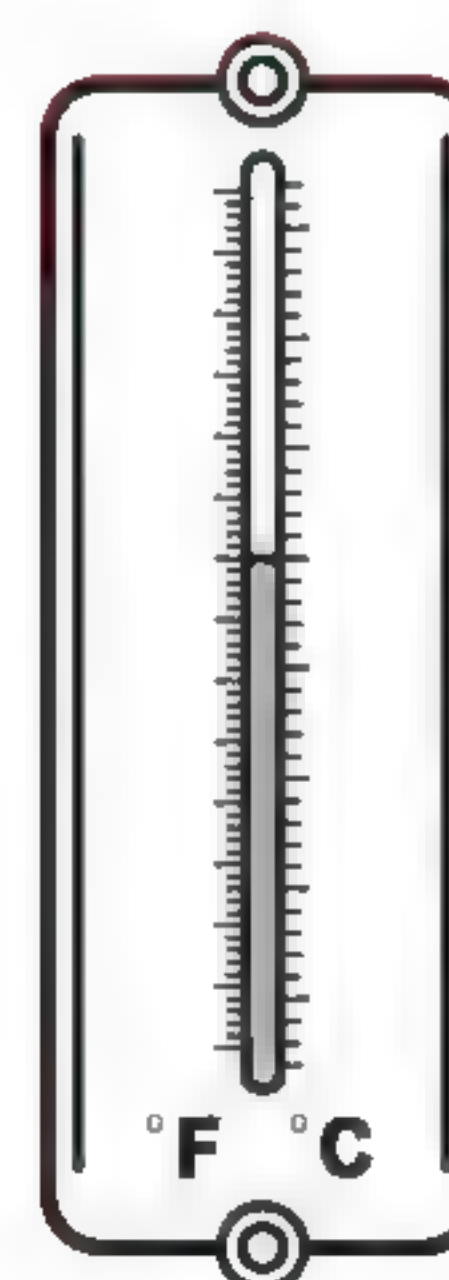
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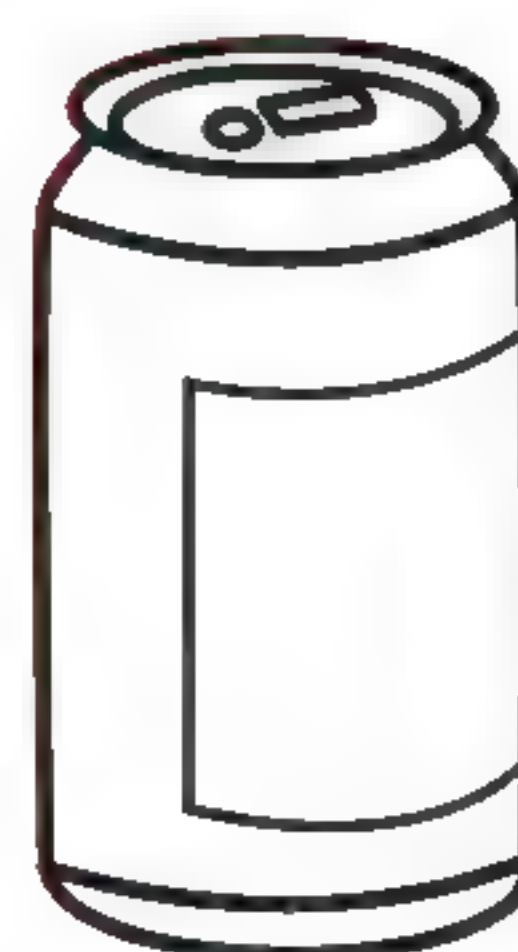
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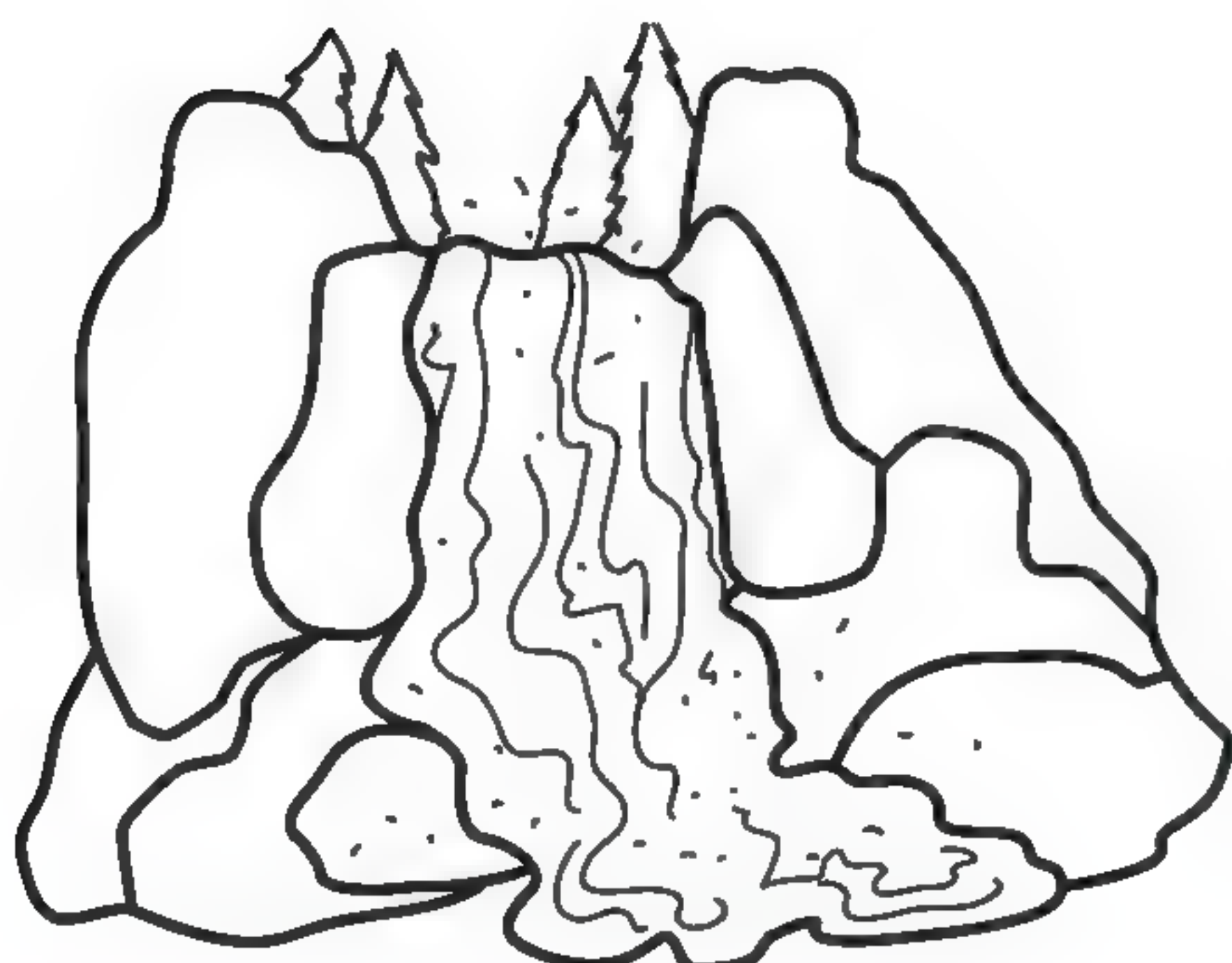
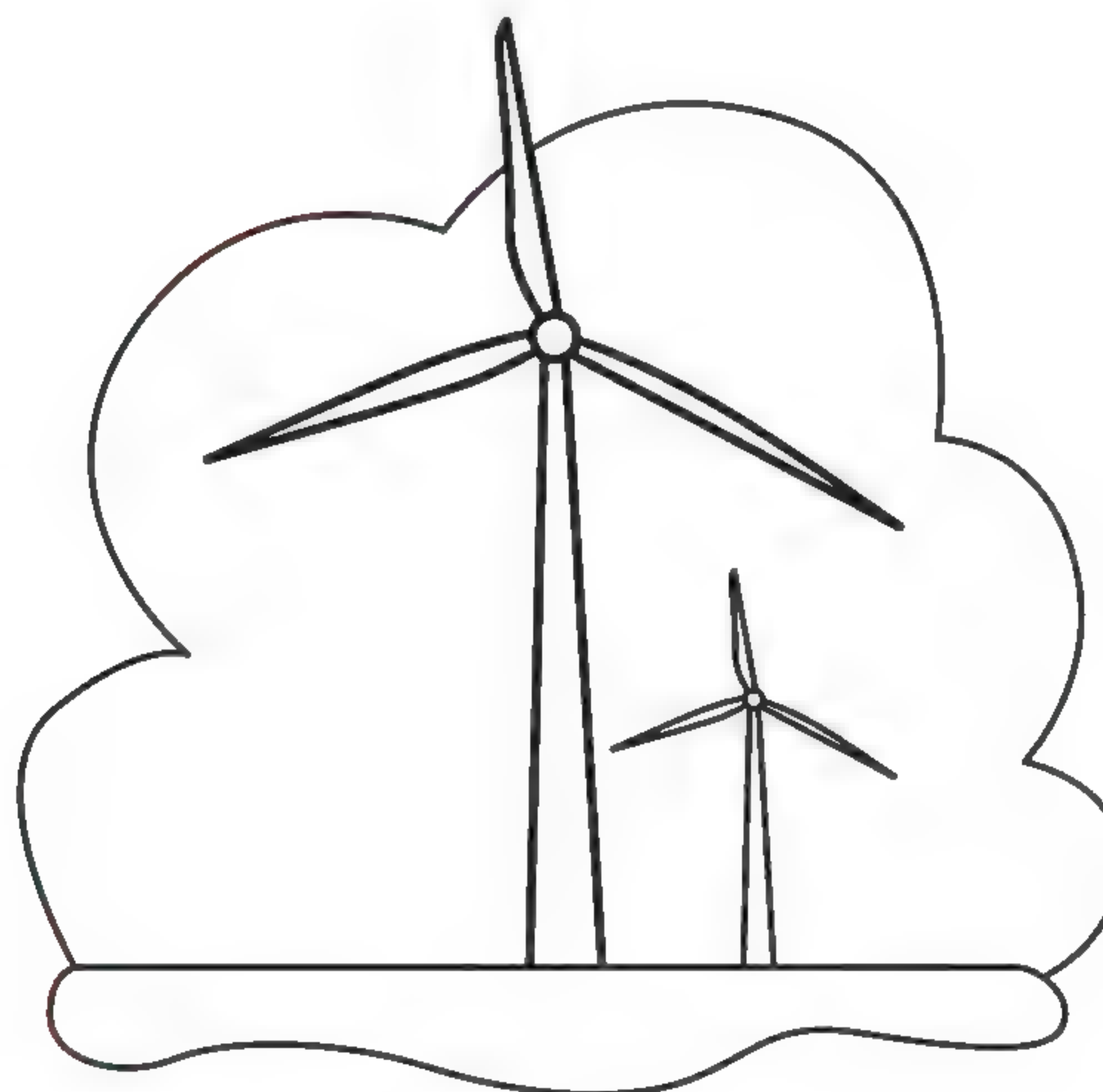
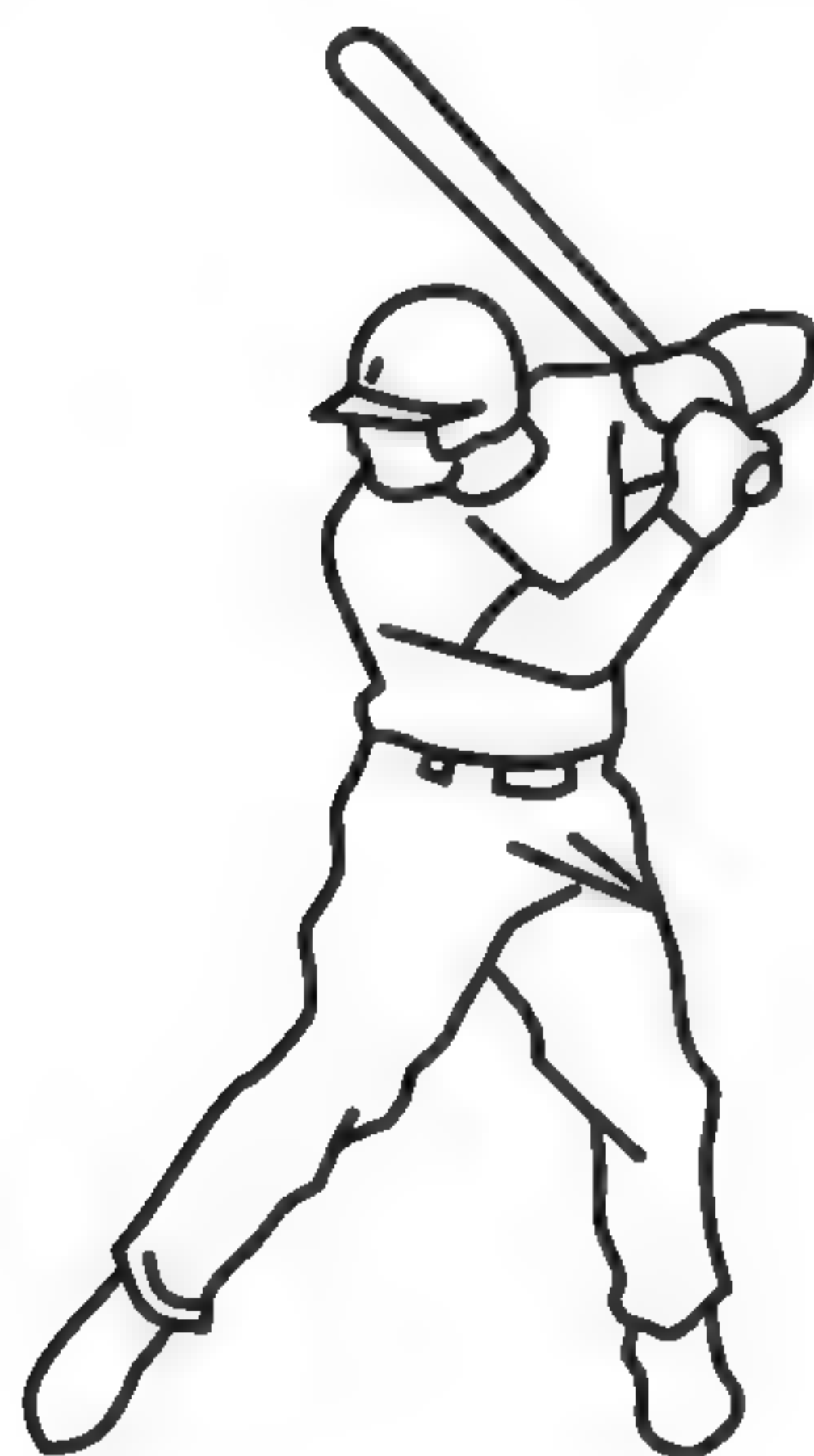
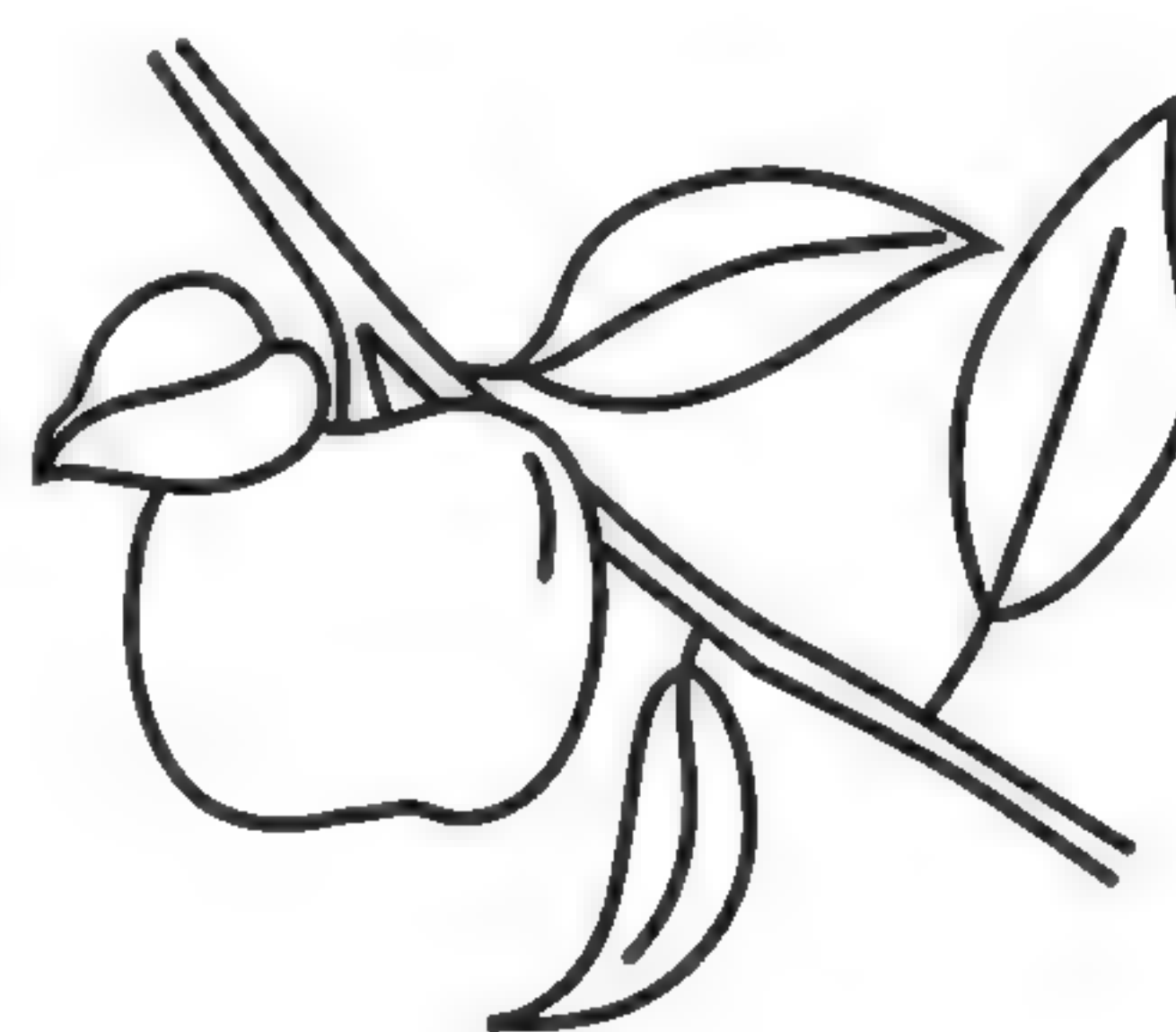


Energy

FACTS

Energy is what makes things happen. Kinetic energy is the energy of movement. A speeding rocket contains kinetic energy. Potential energy is the energy that a still object has because of its position. A diver standing on a board has potential energy because of her height above the water. When the diver dives, her potential energy changes to kinetic energy.

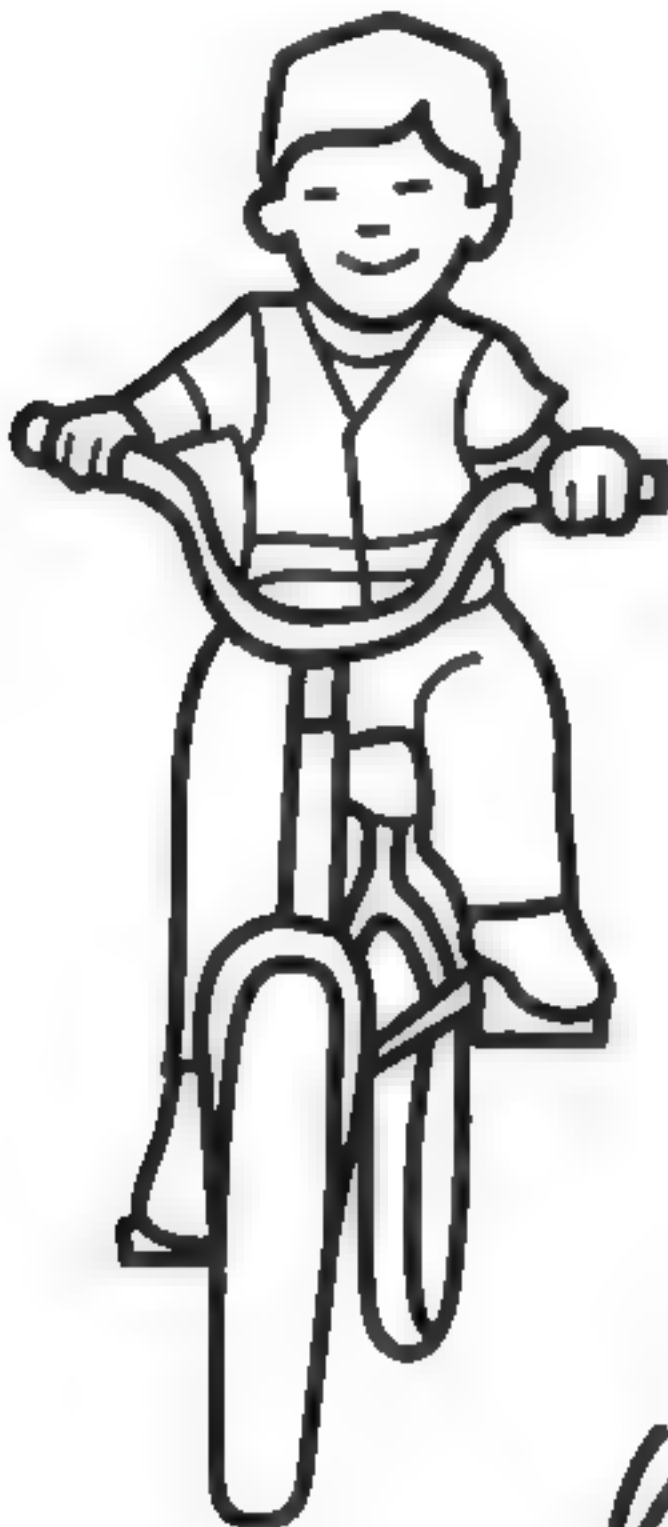
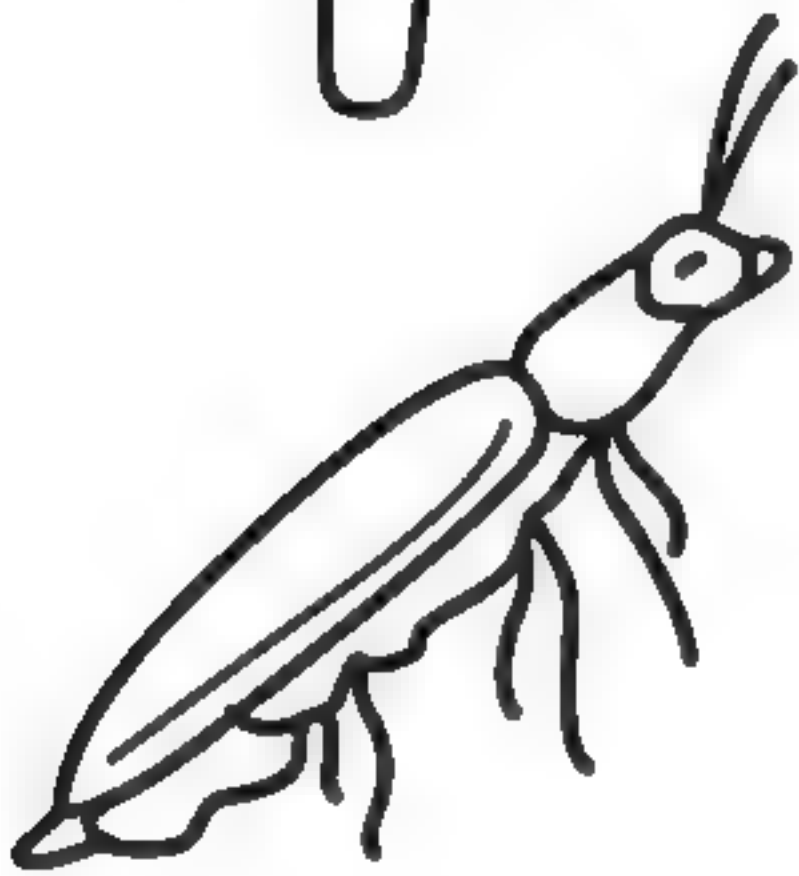
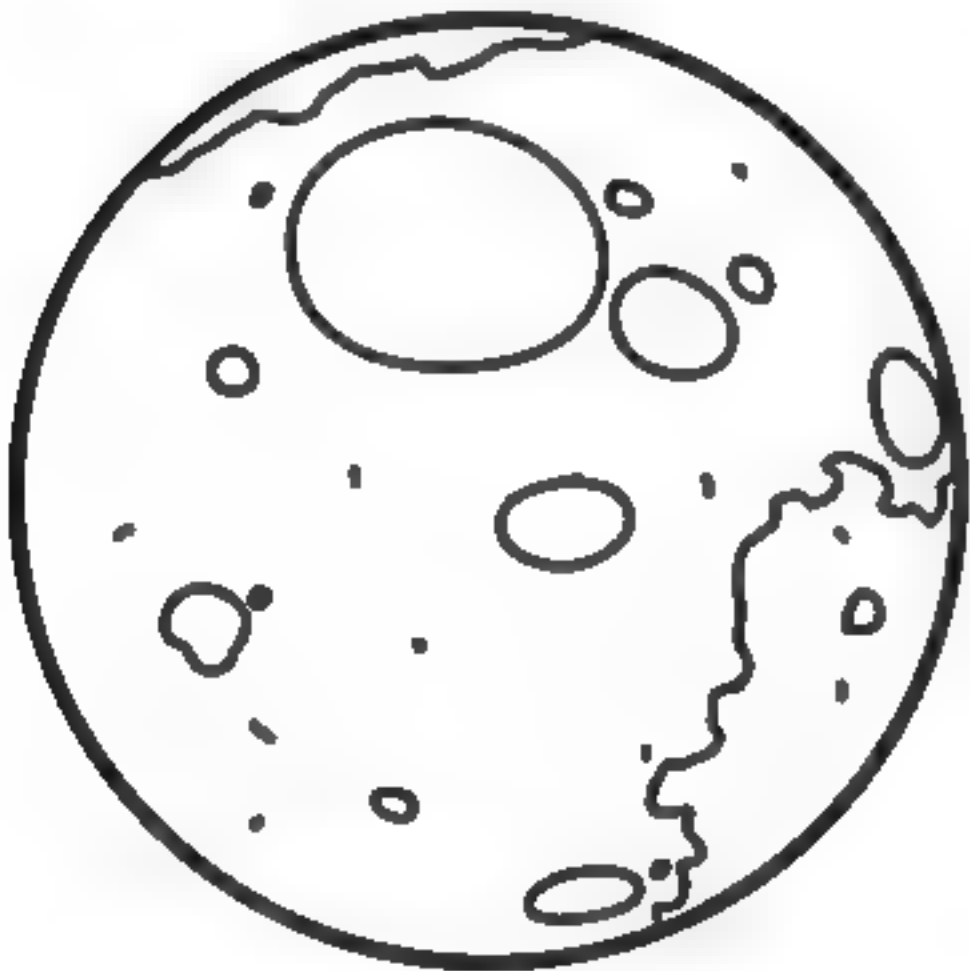
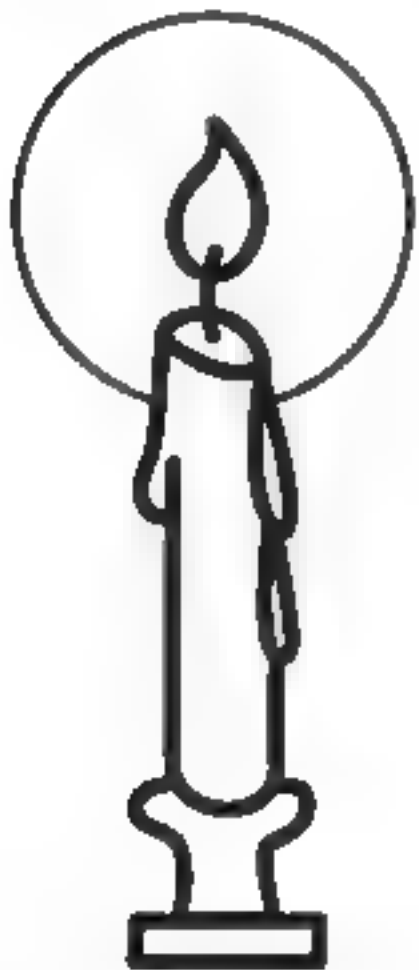
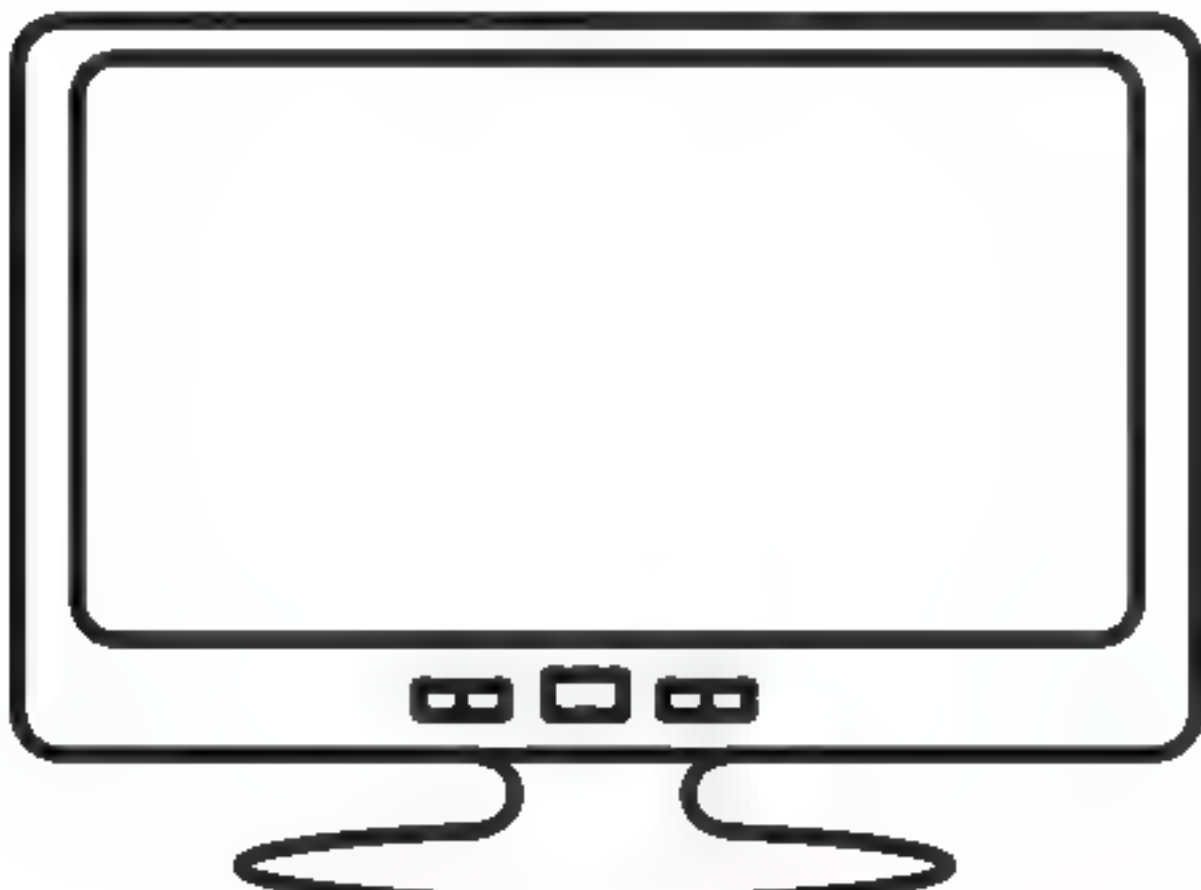
Write **P** in the box next to each picture of potential energy and **K** in the box next to each picture of kinetic energy.

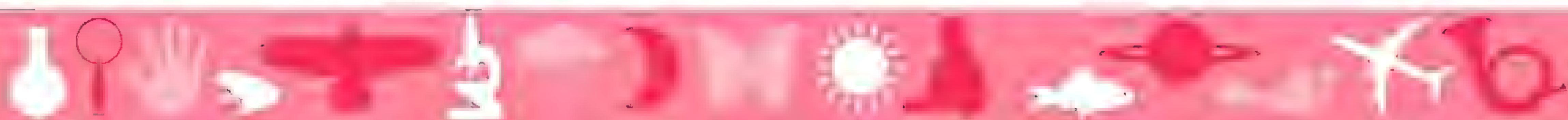




Light enables us to see a bright and colorful world. Light travels in straight lines, called rays. Light bulbs and the sun are sources of light. They make light. Mirrors and many other objects reflect light. They do not make light.

Look at the pictures and put a check (✓) in the correct box, to indicate if it is a source of light or if it reflects light.

		Source of Light	Reflects Light
	Safety strips	<input type="checkbox"/>	<input type="checkbox"/>
	Firefly	<input type="checkbox"/>	<input type="checkbox"/>
	Moon	<input type="checkbox"/>	<input type="checkbox"/>
	Candle	<input type="checkbox"/>	<input type="checkbox"/>
	T.V.	<input type="checkbox"/>	<input type="checkbox"/>



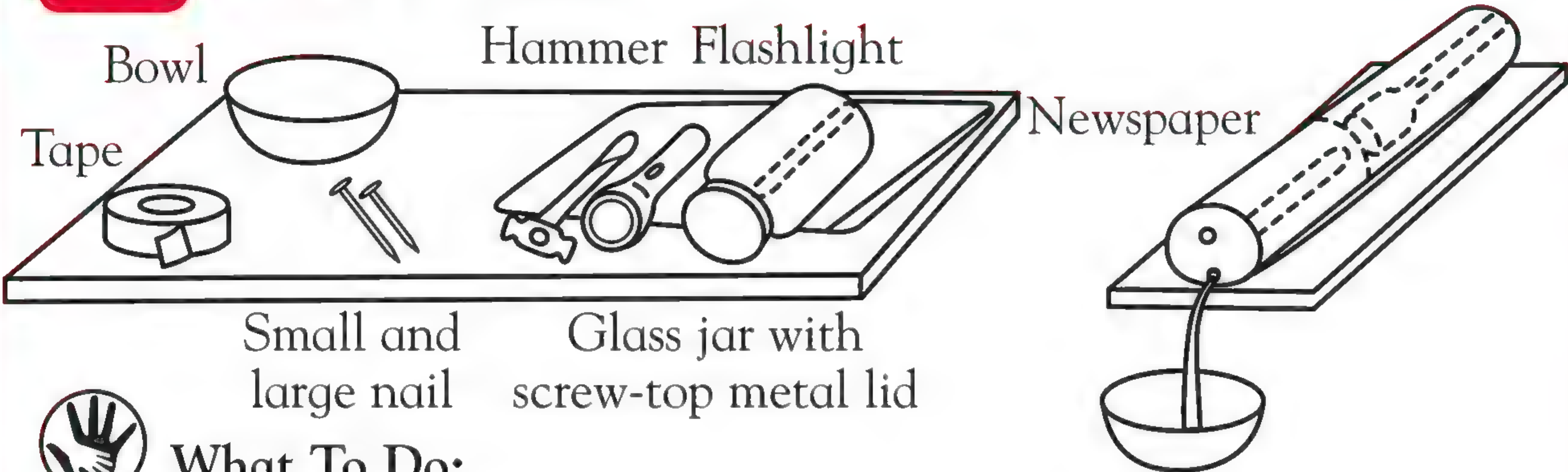


Reflected Light

FACTS

When rays of light hit a smooth, shiny surface, they are reflected back. The flat surface of a mirror, for example, gives a perfect, clear image. Light also reflects off the surface of water.

TEST What You Need:



What To Do:

1. Use the hammer and the nails to make a small hole in the lid of the jar near one edge, and a larger hole near the opposite edge. Ask an adult to help you.
2. Fill the jar with water, then screw the top back on tightly. Cover the holes with tape.
3. Lay the jar lengthwise at one end of the newspaper.
4. Turn on the flashlight. Position it at the bottom end of the glass jar so that its light shines through the jar.
5. Roll up the jar and the flashlight (turned on) in the newspaper so that the newspaper forms a tube around them.
6. Turn off the room light so that it is dark. Remove the tape from the holes in the lid and watch the water pouring out of the jar into the bowl.

RESULT

What do you notice about the streams of water?

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What do you think is happening?

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The eye has many parts. Light enters the eye through an opening called the pupil. The colored part around the pupil is called the iris. The cornea and lens work together to focus light onto the retina—a layer of light-sensitive cells at the back of the eye. The cells pick up the pattern of light and send signals to the brain along the optic nerve to form the image that we see.

Look at the picture and use the words in the box to complete the sentences.

Cornea

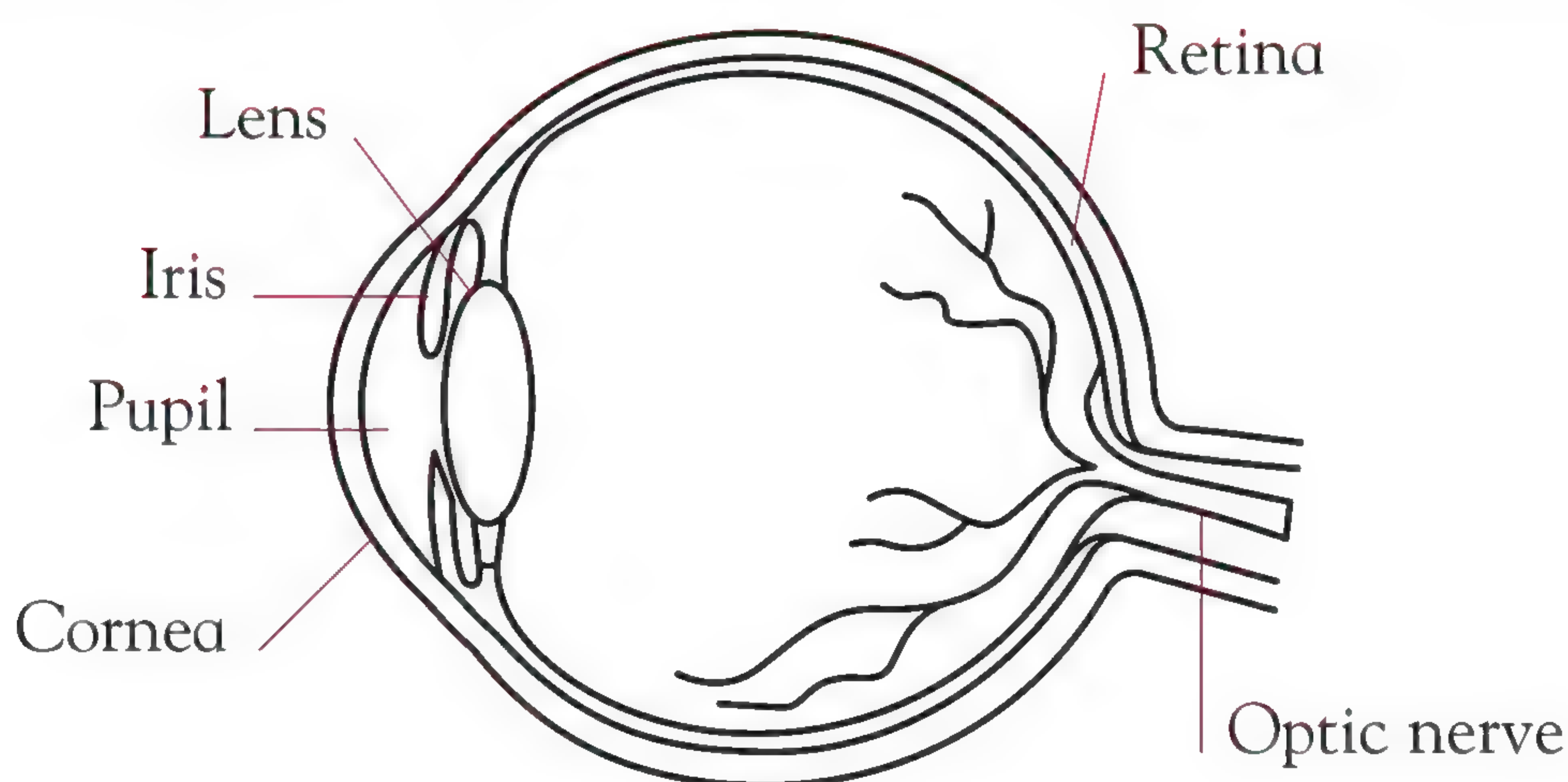
Iris

Lens

Optic Nerve

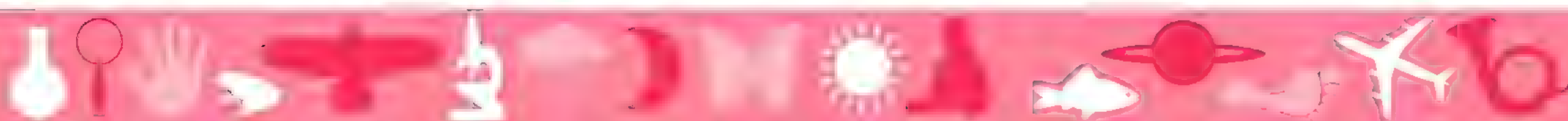
Pupil

Retina



Cross-section of the eye

1. The is a clear layer at the front of the eyeball.
2. The is a ring of colored tissue around the pupil.
3. The is a hole that lets light into the eye.
4. The is a curved structure that bends light rays entering the eye.
5. The is a layer of cells at the back of the eye that detects light.
6. The sends messages from the eye to the brain.



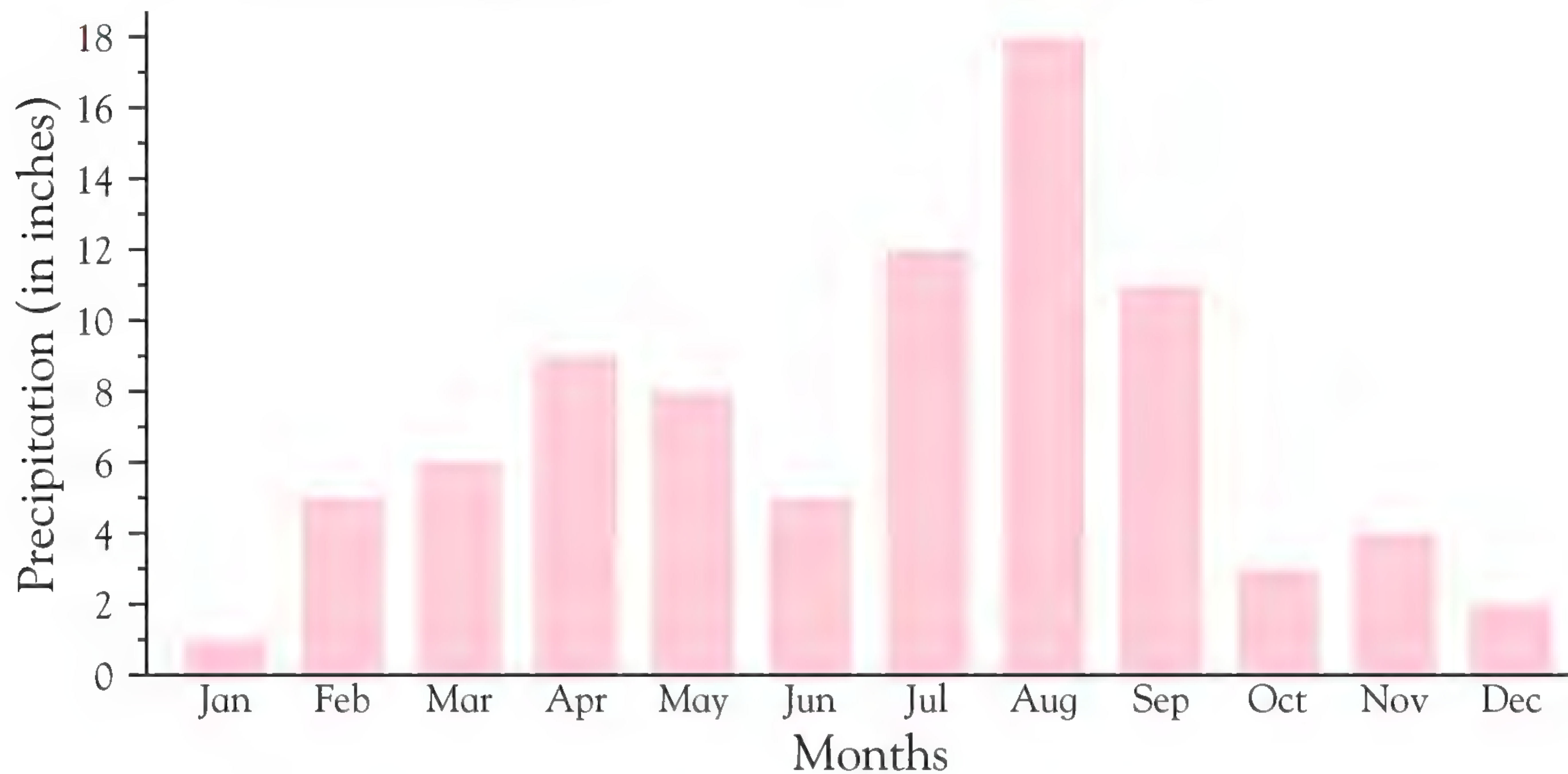


Precipitation

FACTS

Precipitation is water that falls through the atmosphere to the ground in the form of rain, snow, sleet, and hail.

The graph shows the average amount of precipitation that falls each month in a certain region. Use it to answer the questions.



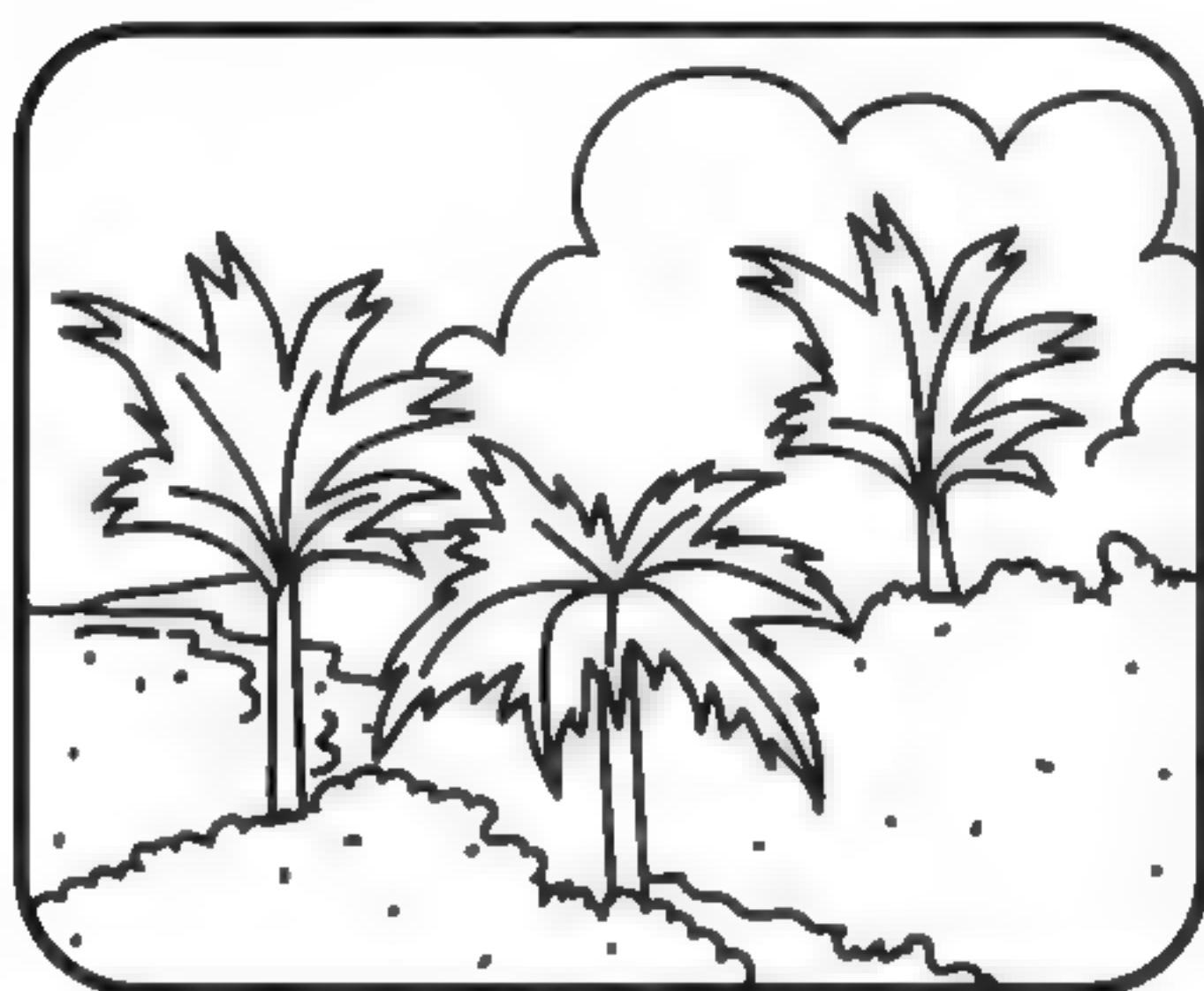
- 1. Which month has the least precipitation?
- 2. Which month has the most precipitation?
- 3. Which month has 8 inches of precipitation?
- 4. Which month has double the precipitation as March?
- 5. Which month has half as much precipitation as May?
- 6. What is the average precipitation for October, November, and December?
- 7. Which months have the same amount of precipitation?
- 8. Which season has the most precipitation?



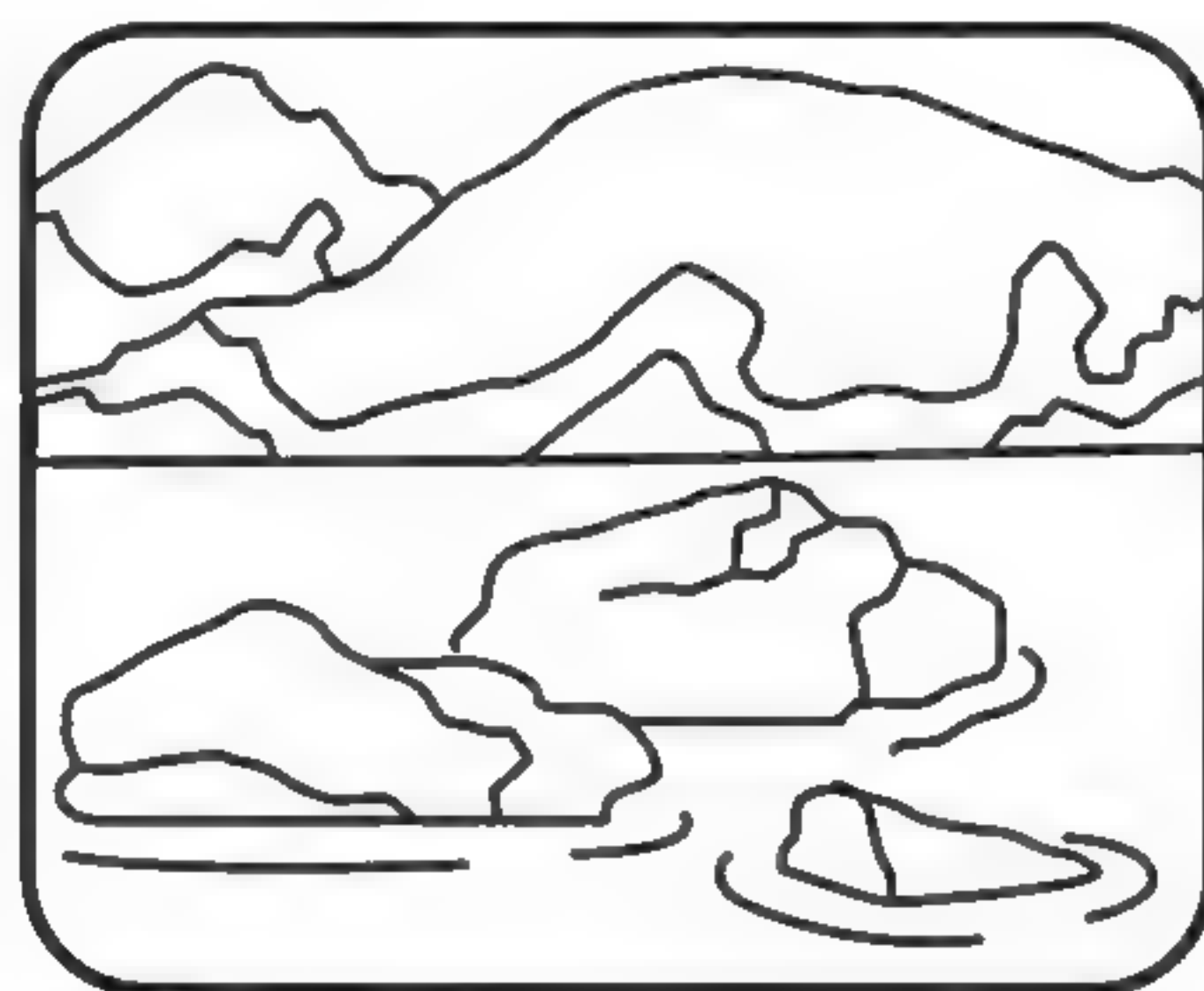


Every part of the world has its own typical pattern of weather, or climate. An area's climate is affected by three main factors: its latitude (distance north or south of the equator), its height above sea level, and its distance from the sea. The climate of a region affects the kind of animals and plants that make their home there.

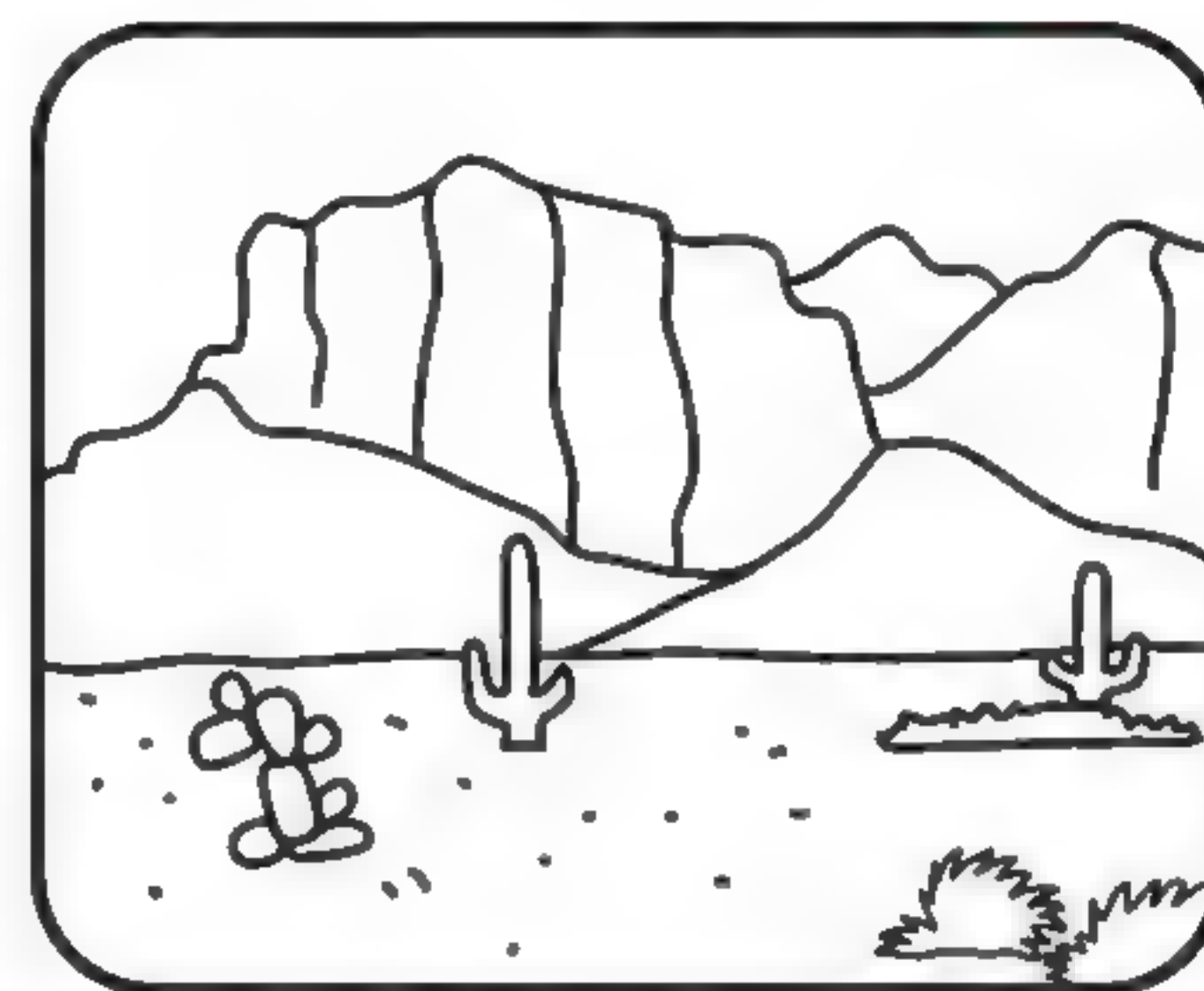
Look at the pictures of these four climate zones, and use the words in the box to complete the sentences.



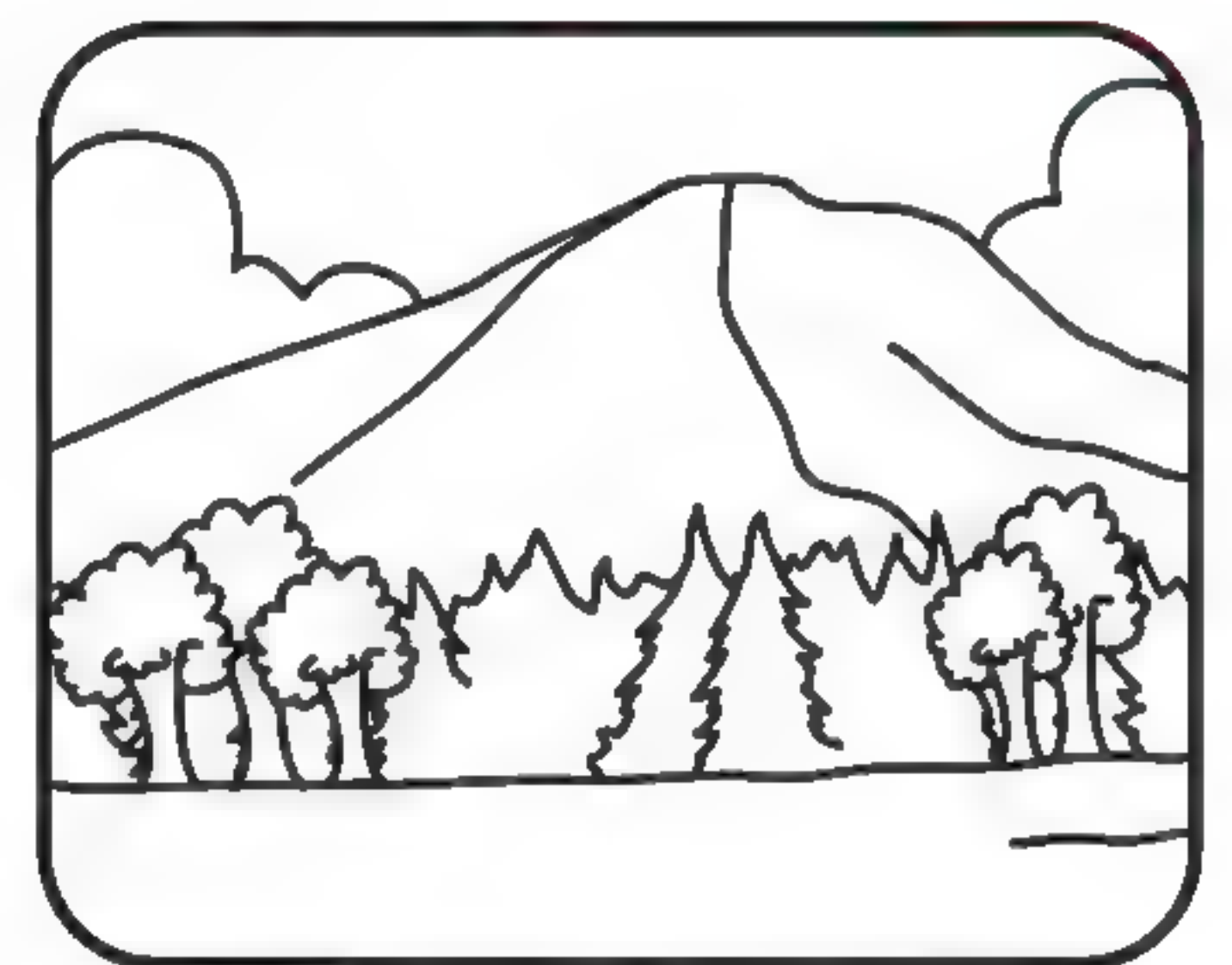
Tropical regions are found near the equator, and are hot and wet all year round.



Polar climates are cold and dry, with long dark winters.



Deserts are dry regions, with less than 9 inches of rain a year, but can be hot or cold.



Temperate climates have warm summers and cool winters, with rain all year round.

Desert

Equator

Polar

Rainfall

Temperate

1. The climate of a region depends partly on how far it is from the
2. A climate has distinct seasons, with warm summers and cool winters.
3. A tropical climate is hot with high
4. A climate is cold and dry.
5. A region of can be hot or cold, but is always very dry.





Animal Adaptation

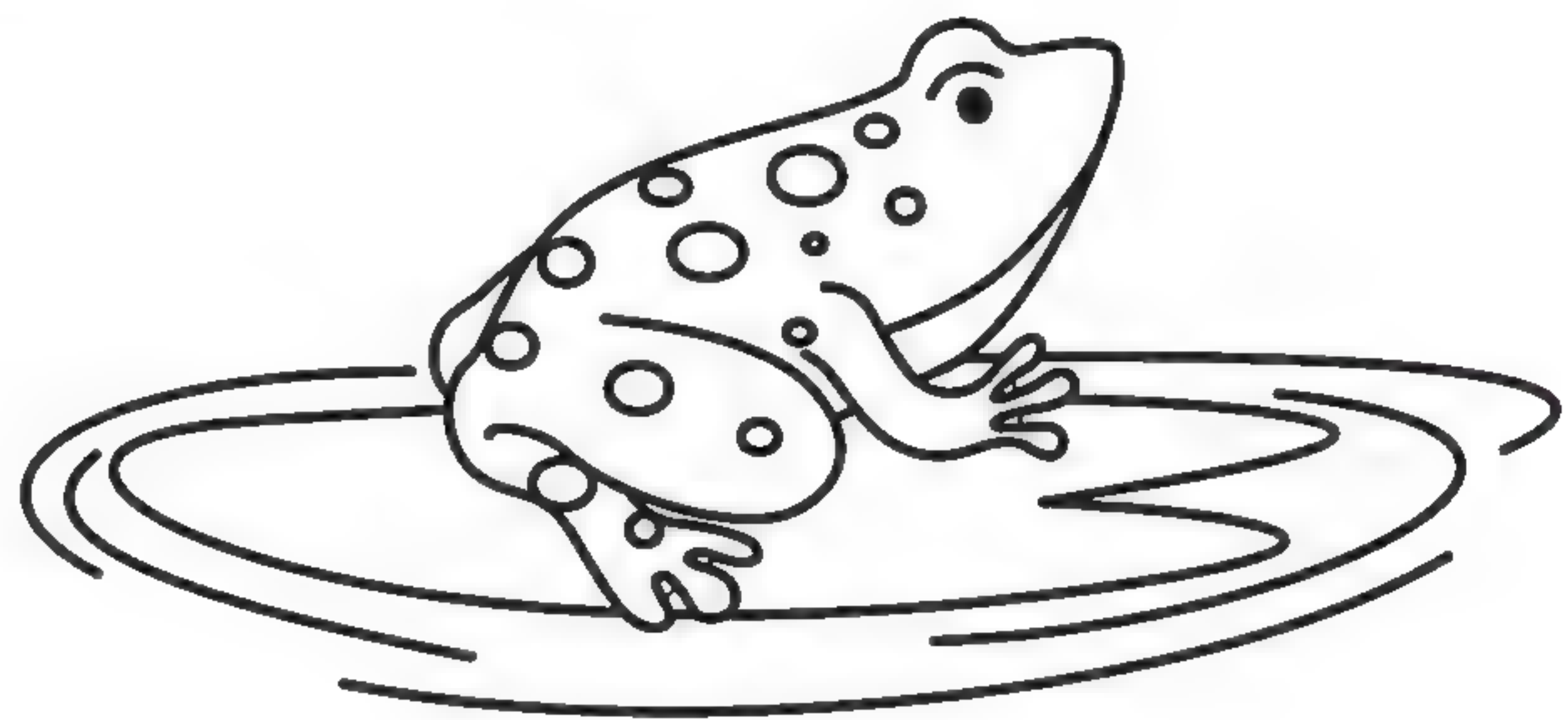
FACTS

Animals come in many different shapes and sizes. Most animals live in one type of habitat because they are suited to it. We say they are adapted to the environment in which they live. For example, squirrels have sharp claws to grip and long tails to help them balance as they race up and down the trees.

Look at these pictures. Explain how each animal has adapted to its habitat.



A mole burrows in dark underground tunnels.



A frog lives in ponds, among the weeds.

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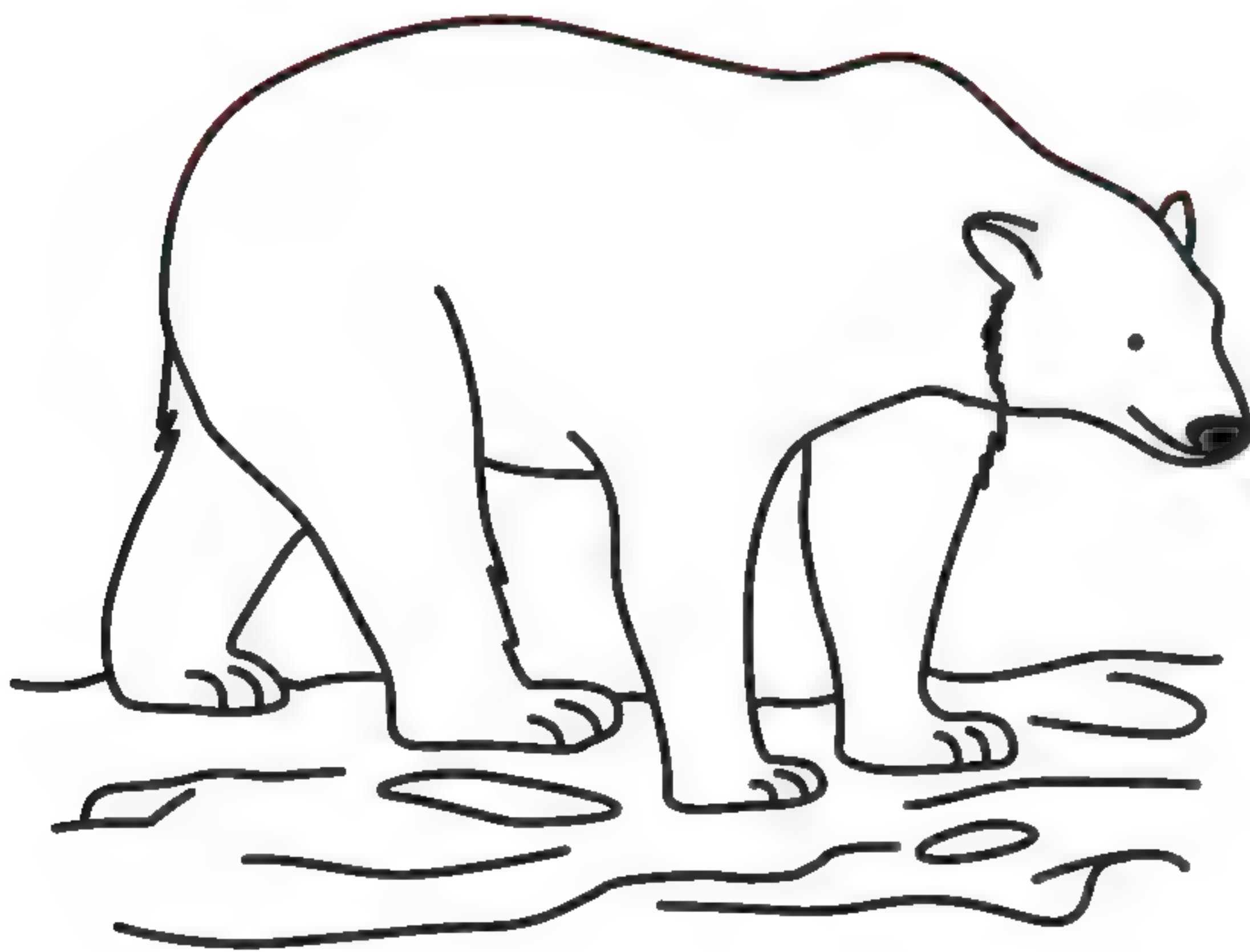
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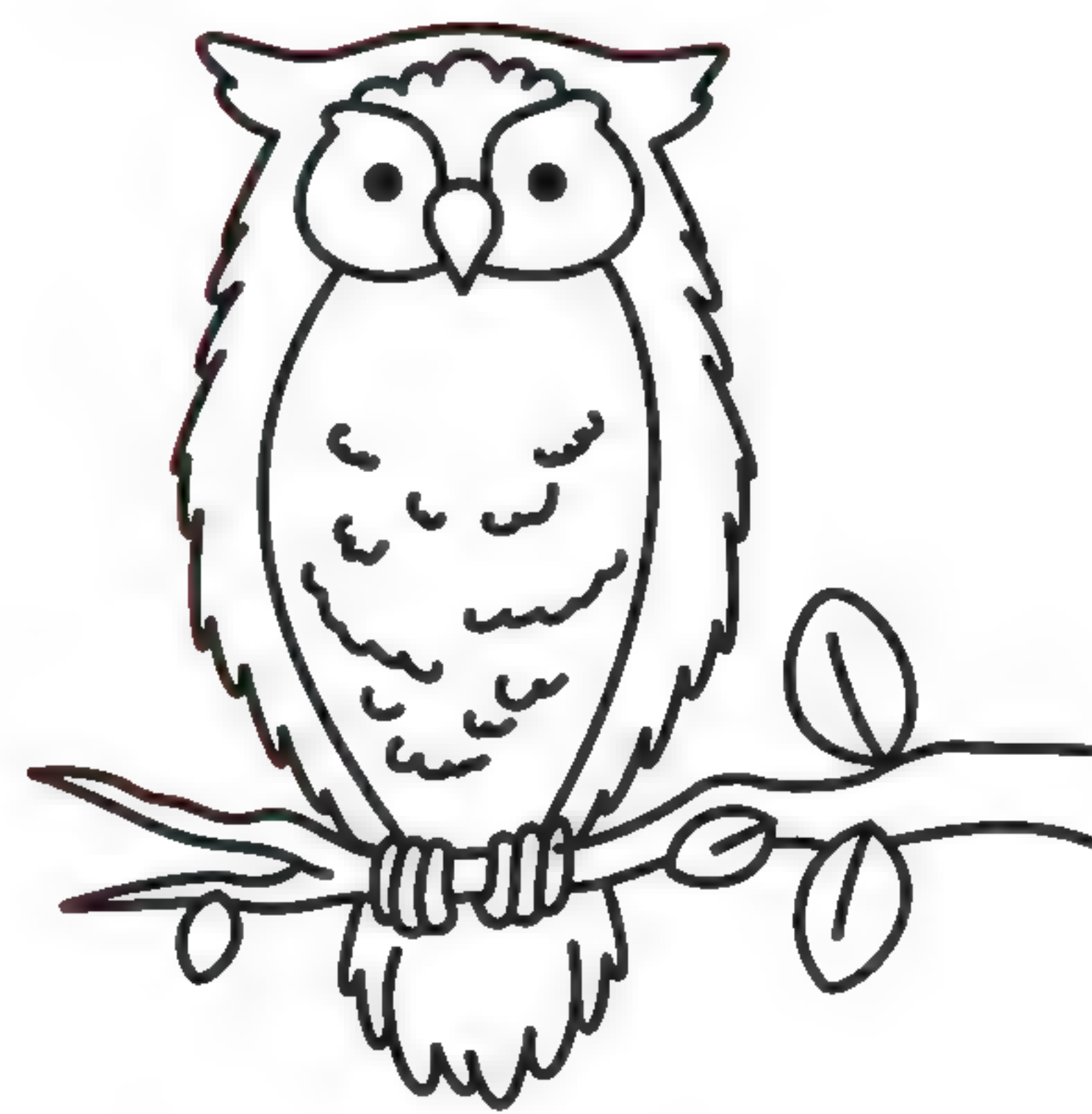
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A polar bear lives in the snowy Arctic.



An owl is nocturnal and lives in the trees.

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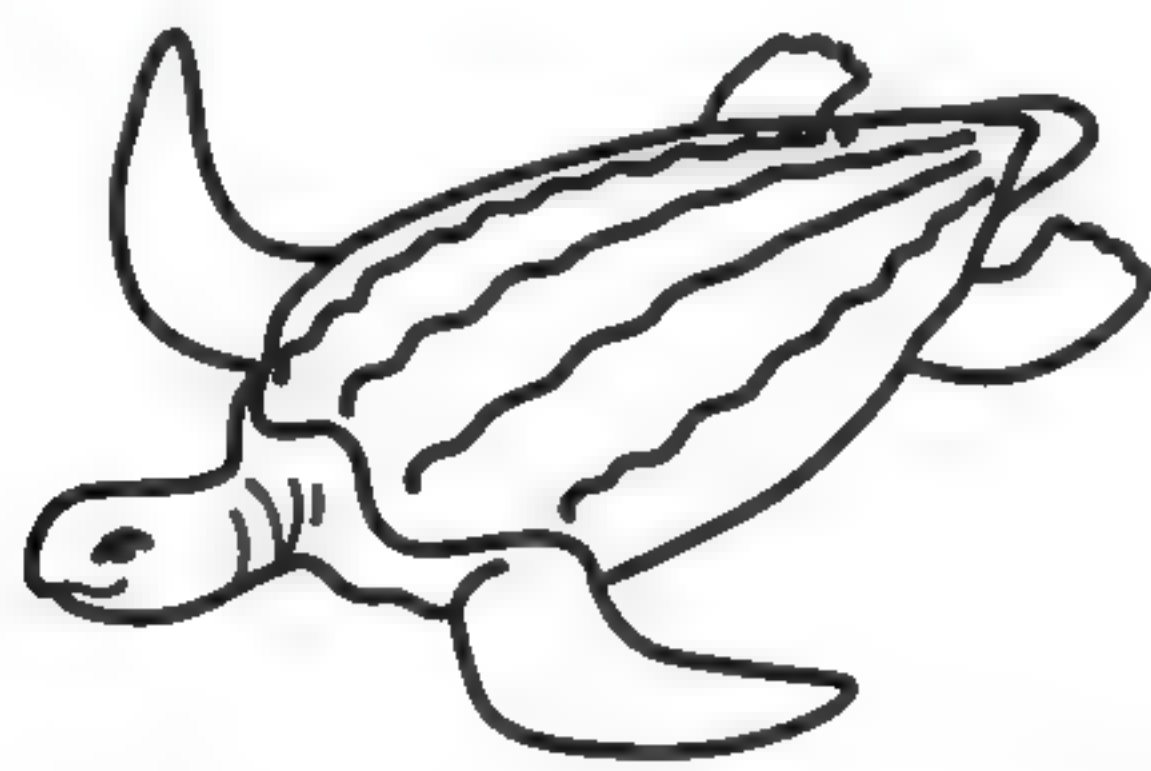
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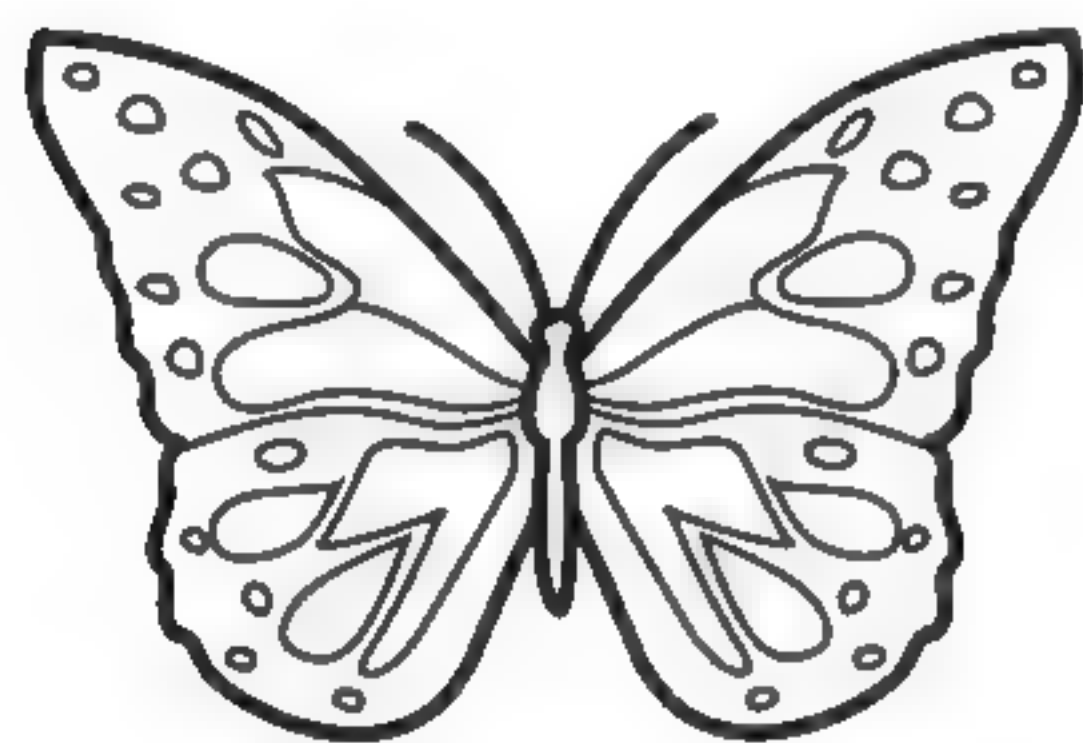


Every year, some animals make long journeys from one area to another, and then back again. This behavior is called migration. It is usually triggered by a change in the seasons or weather. The animals travel in search of food, or to find the best place to bring up their young.

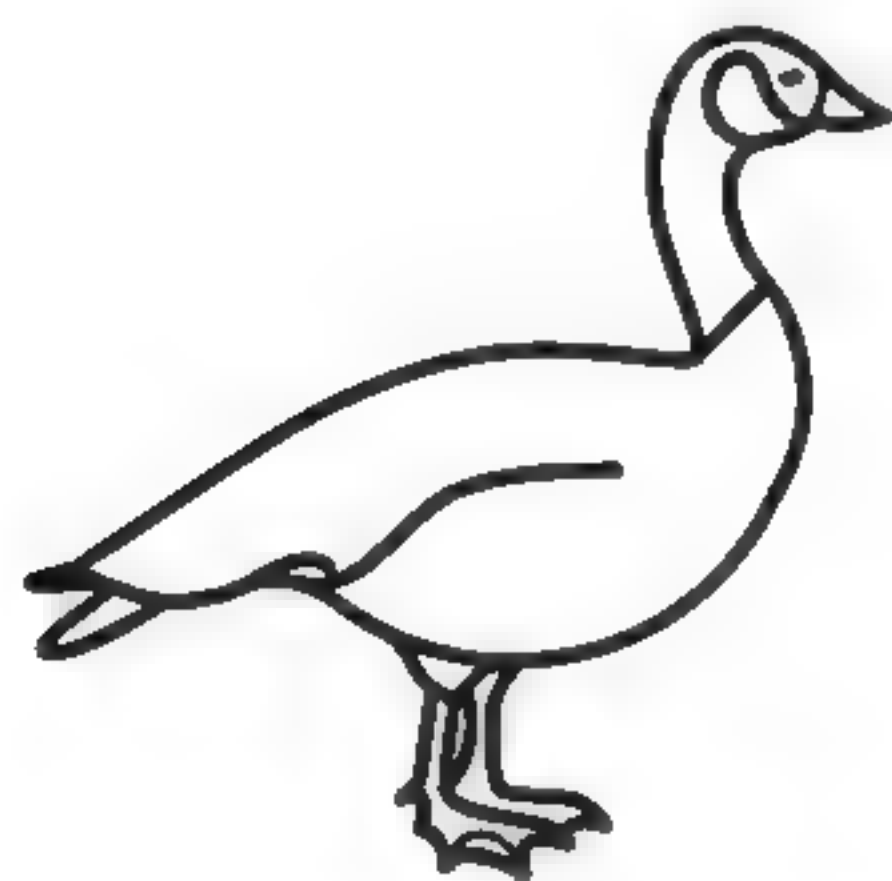
Draw a line between each animal and the sentence that describes why it migrates.



Leatherback turtle



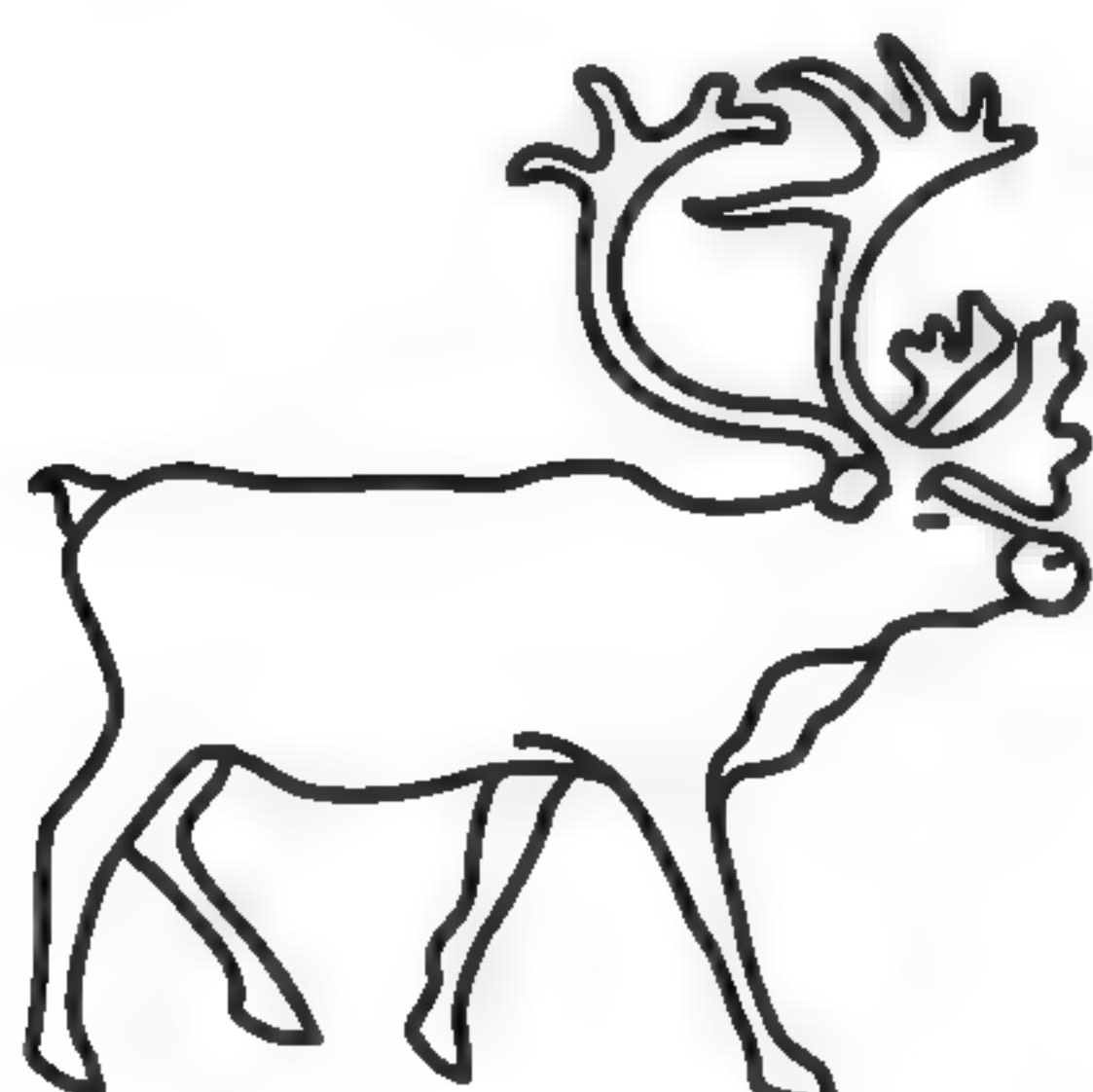
Monarch butterfly



Canada goose



Salmon



Caribou

These North American insects spend the winter in the warmer south and fly north in the spring in search of the plants they eat.

This fish lives most of its life at sea, but returns to fresh water to breed, swimming far up river.

This giant reptile travels the ocean, but once a year the female returns to the same tropical island to lay its eggs.

These mammals travel in large herds, making long journeys in search of food.

These birds breed around the Arctic Circle in summer, and fly south to warmer climates in the winter.



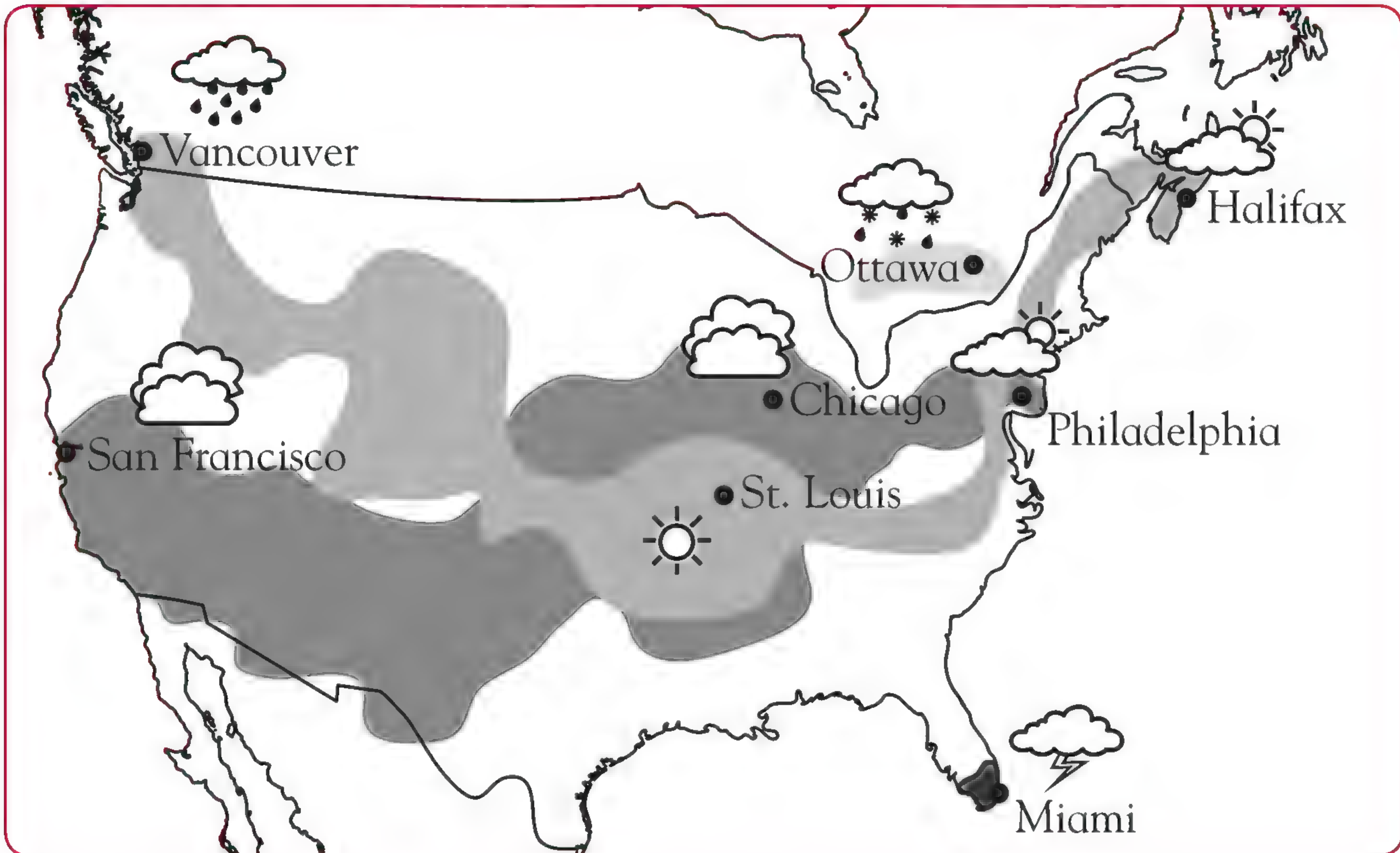


Weather Map

FACTS

A weather map shows the weather conditions over a large area at a certain time.

Study the map and the key and then describe the weather for each of the cities listed:



Key

Sunny

Snow

Cloudy

Partly cloudy

Rain

Thunderstorm

20°C

30°C

40°C

60°C

Chicago

Halifax

Miami

Ottawa

Philadelphia

San Francisco

St. Louis

Vancouver

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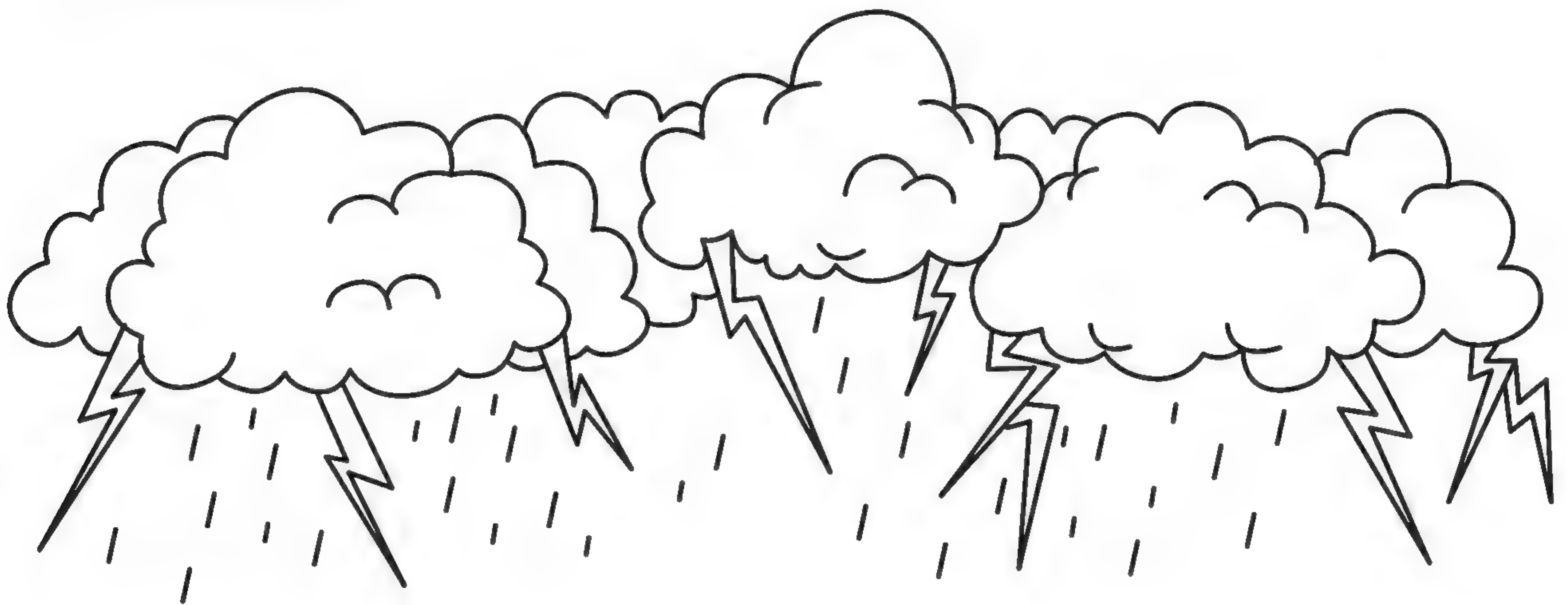
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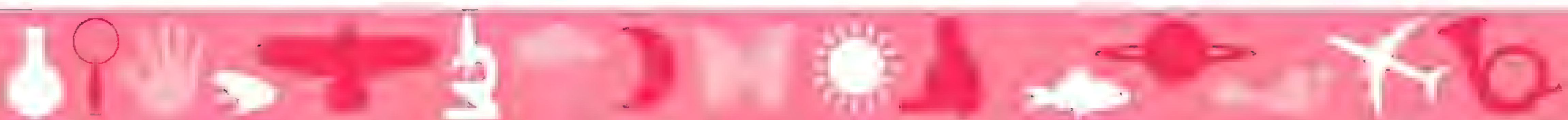


Sometimes the weather becomes extreme. A hurricane is a huge spinning storm that forms over tropical oceans. A very strong and snowy winter storm is called a blizzard. A tornado is a swirling, funnel-shaped column of air over land that can be very destructive. A tornado over water is called a waterspout.

Read the descriptions below and circle the type of weather that is described.



- | | | |
|--|---|--|
| <p>1. A towering column of violently swirling air that forms over land.</p> <p>A. Breeze
B. Storm front
C. Tornado</p> | <p>3. A vivid flash of electricity created during a storm.</p> <p>A. Electrocution
B. Lighting
C. Lightning</p> | <p>5. The loud noise caused by lightning.</p> <p>A. Blowback
B. Thunder
C. Whirlwind</p> |
| <p>2. A storm with lots of snow, cold temperatures, and strong winds.</p> <p>A. Blizzard
B. Gale
C. Hail storm</p> | <p>4. A violent storm with strong winds and heavy rains that forms over tropical oceans.</p> <p>A. Gale
B. Global wind
C. Hurricane</p> | <p>6. A towering column of spinning water that occurs over water.</p> <p>A. Jet spray
B. Water cycle
C. Waterspout</p> |





Tornado in a Bottle

The swirling movement of air and debris in a tornado is called a vortex. You can see a vortex by making your own tornado in a bottle.

TEST

What You Need:



What To Do:

1. Add a few drops of dishwashing liquid, a few drops of food coloring, and a couple of pinches of glitter to the bottle with water in it.
2. Turn the empty bottle over and attach the mouths of the two bottles securely together with the tape.
3. Turn the bottles upside down (so the bottle filled with water is on top). Move the bottles in a circular motion so that the water in the upper bottle starts to swirl.

RESULT

Describe what happens.

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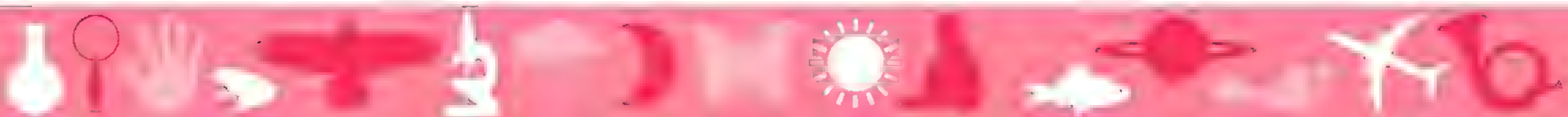


Weathering is the breaking down of large rocks into smaller and smaller rocks, until they become soil. This can happen by the action of wind or water or ice. Erosion is when rock or soil or sand gets washed (or blown) away over time by the movement of wind, running water, glaciers, or rain.

Read each sentence below and write **W** in the box if it is an example of weathering, or **E** if it is an example of erosion.



1. A flood washes soil from a farmer's land.
2. Wind blasts sand at a rock, wearing away the rock.
3. A glacier carries rocks down a mountainside.
4. Wind blows sand across a desert.
5. Rain carries mud down a hillside.
6. Water seeps into a crack in a boulder and then freezes and breaks the rock apart.

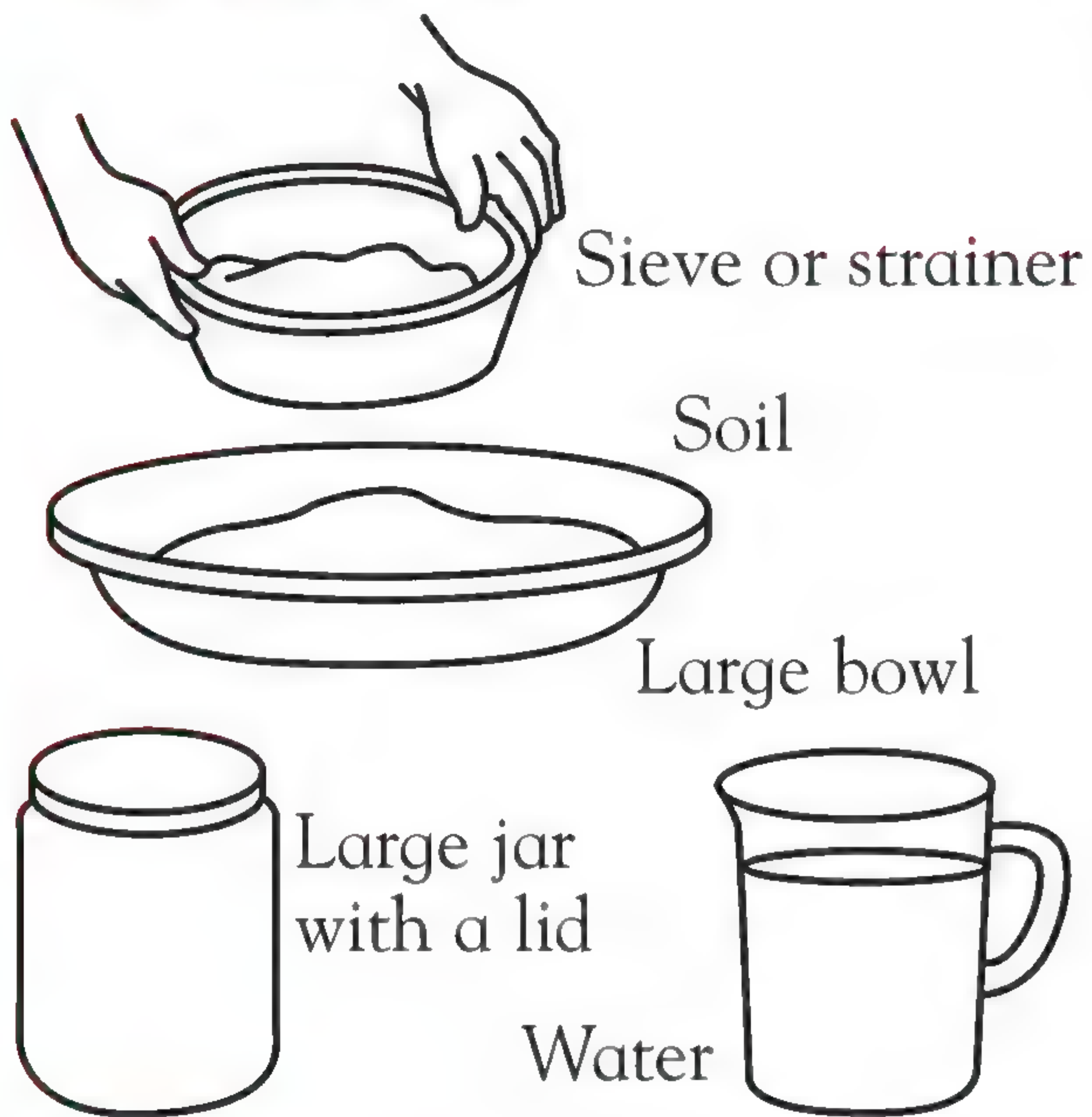
☐☐☐☐☐☐



The texture of soil depends on its mixture of sand, silt, and clay.

TEST

What You Need:



What To Do:

1. Pour the soil into the sieve and shake it over the bowl. The sieve will sift any pebbles and bits of debris from the soil.
2. Fill one-third of the jar with soil and add water.
3. Screw the lid on tightly and shake the soil-water mixture for 30 seconds.
4. Place the jar on a table and wait for a few days.

RESULT

Draw and label what appears in the jar. Explain what you can see.

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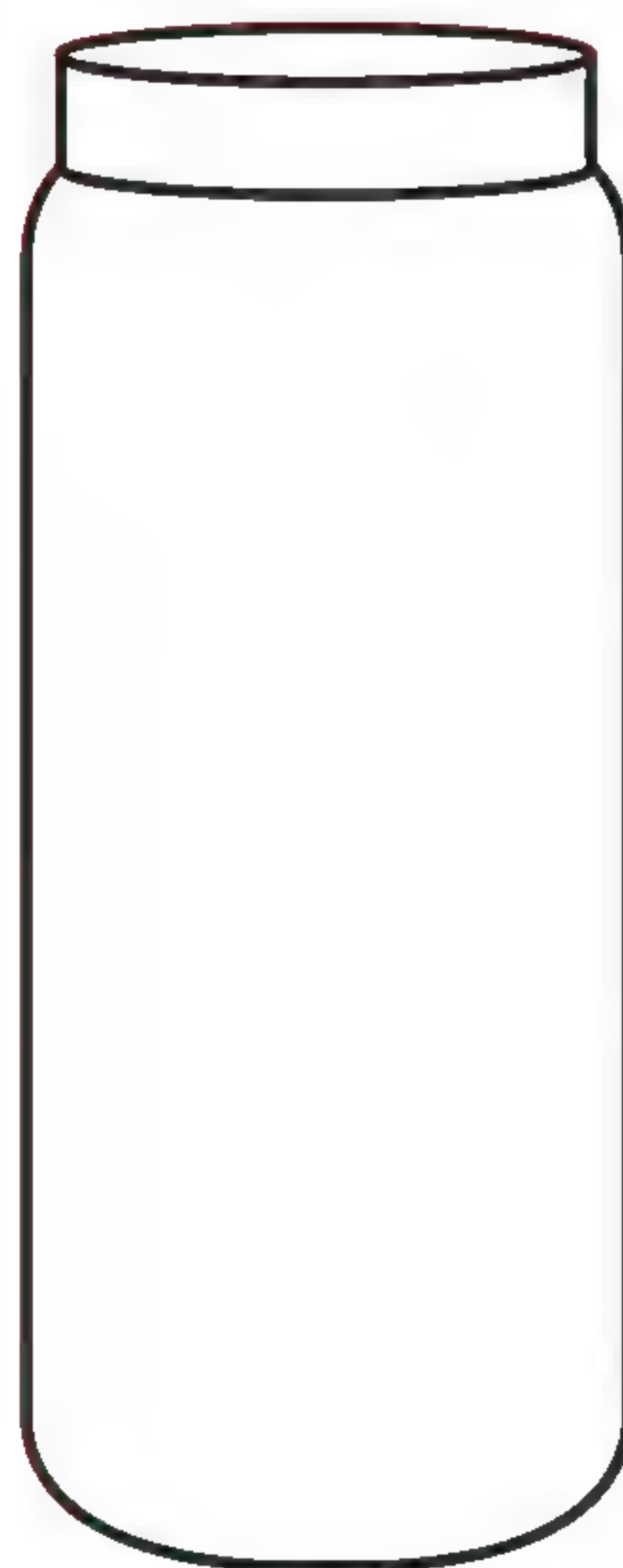
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The surface of the Earth has been shaped by many forces—the weather, volcanoes, earthquakes, ice, and water in rivers and oceans. The result is a varied landscape that includes high mountains, deep valleys, flat plains, and an ever-changing coastline.

Use the words in the box to name the features of the landscape in this picture.

Coastline

Island

Lake

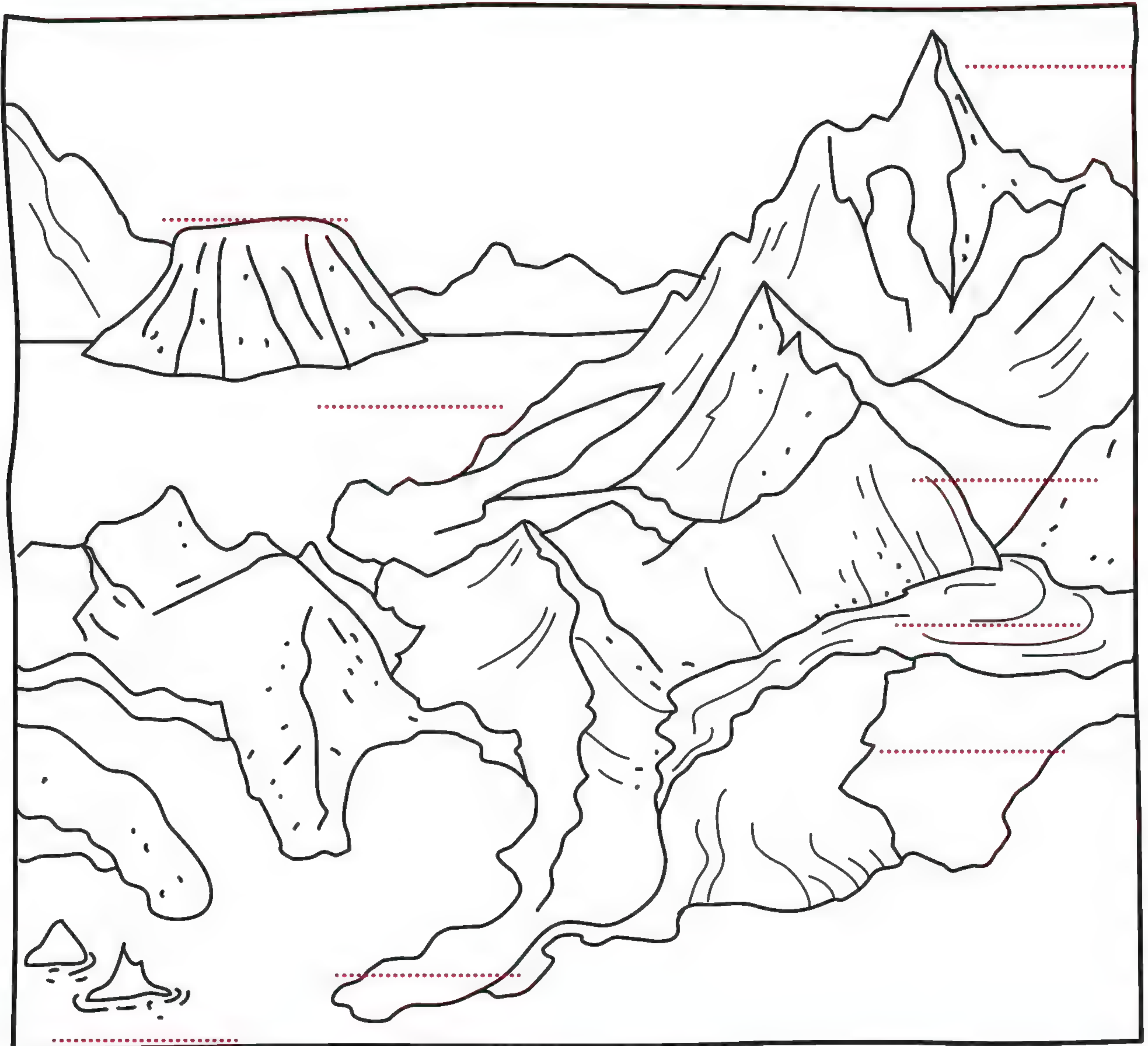
Mountain

Peninsula

Plateau

River

Valley





Certificate

Congratulations to

.....

for successfully
finishing this book.

GOOD JOB!

You're a star.



Date

.....



Answer Section with Parents' Notes

This book is intended to assist children studying science at the third-grade level. The science covered supports what children are learning during 3rd grade.

Contents

Working through this book, your child will gain knowledge about:

- the scientific method;
- the solar system;
- the planets and moon;
- bones and muscle;
- movement;
- the heart;
- the circulatory system;
- the skin;
- vertebrates and invertebrates;
- ecosystems;
- animal adaptation;
- predators;
- metamorphosis;
- marsupials;
- wetlands;
- photosynthesis;
- heat;
- friction;
- mass;
- the elements;
- potential and kinetic energy;
- light;
- the human eye;
- precipitation;
- climate;
- weather maps;
- extreme weather;
- weathering and erosion;
- soil;
- landforms.

How to Help Your Child

This is the fifth in the DK Workbooks: Science series. The previous four were written for children in Pre-K, Kindergarten, 1st Grade, and 2nd Grade. The content in each book is aligned with the standard curriculum for that grade level. The books include various types of written activities to test your child's knowledge of earth science, life science, and physical science concepts. They also contain hands-on activities that can be assembled from simple, safe-to-use household items.

The hands-on activities are designed not just to test your child's knowledge, but also to give him or her practice in the basic skills of scientific investigation—following a plan, making observations and predictions, recording data, and drawing inferences and conclusions. Your child will need guidance from you while assembling the materials and following the directions for many of the activities. The notes at the end of the book will assist you in doing that. The notes also contain ideas for more hands-on activities as well as background information and critical thinking questions that can help make the book an enjoyable and educational experience.

FACTS Scientists study different parts of nature and the universe.

Label the name of each scientist to complete the sentence.

Marine biologist

Meteorologist

Paleontologist



Meteorologist studies the atmosphere.



Paleontologist studies fossils.



Marine biologist studies life forms in the oceans.

Write **P** near the objects that interest a paleontologist, **MB** near the ones that interest a marine biologist, and **M** near the ones that interest a meteorologist.



Dinosaur footprint **P**



Clouds **M**



Fish **MB**



Jellyfish **MB**



Dinosaur teeth **P**

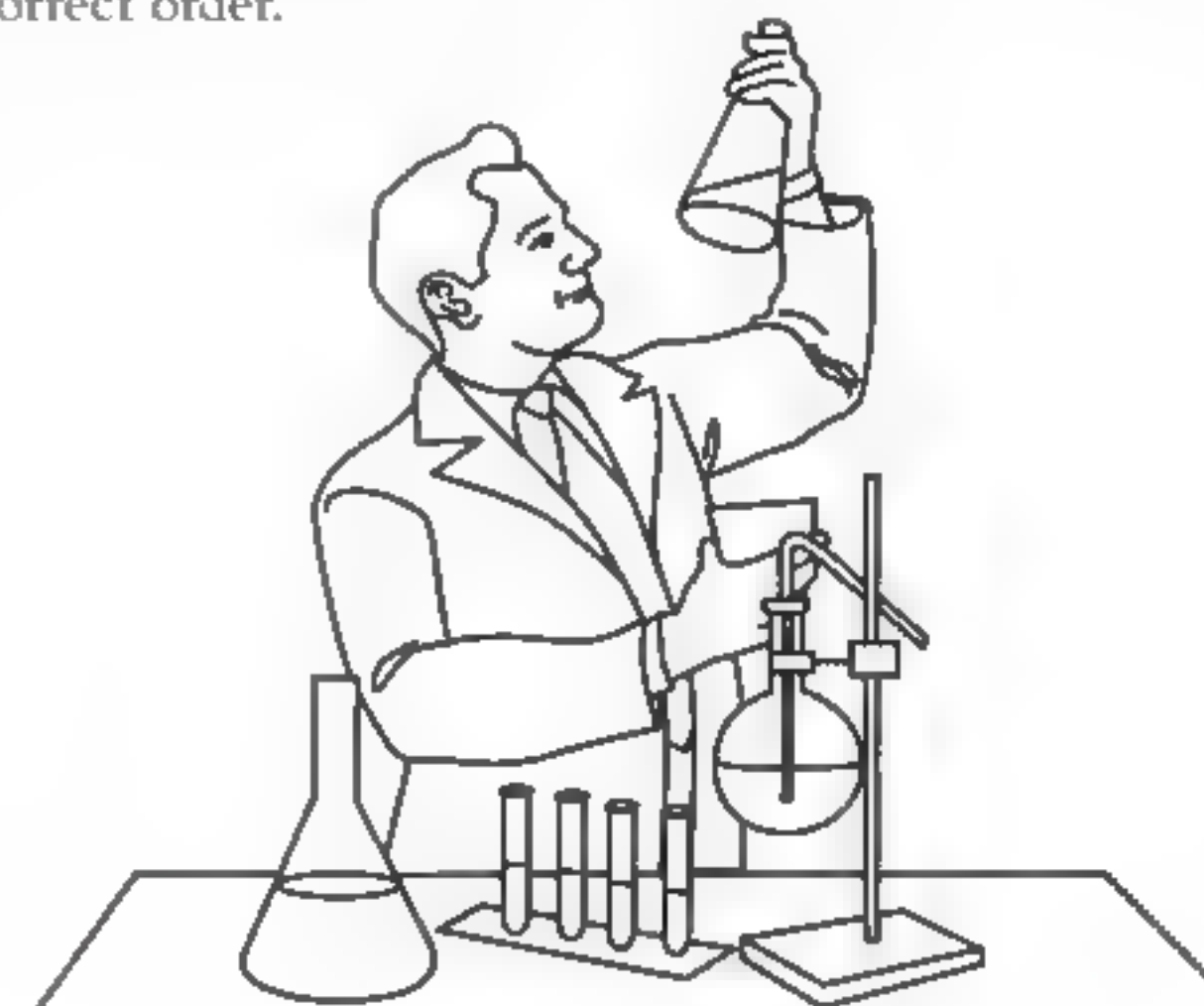


Tornado **M**

Do scientists work or live in your community? What types of scientists are they? Where do they work? What do they study? Ask your child: "If you were going to be a scientist, what would you study? Why?"

FACTS Scientific investigations follow a step-by-step process called the scientific method. First a scientist asks a question about why something happens. He or she then researches the subject to come up with a theory, called a hypothesis. Experiments are carried out to test the hypothesis. The scientist then reaches a conclusion which may or may not prove the theory is true. Finally, the results must be published so other scientists can check the hypothesis.

Using the numbers 1 to 6, put the six steps of the scientific method in the correct order.



6 Report the results.

1 Ask a question.

3 Come up with a hypothesis.

5 Analyse the results to reach a conclusion.

4 Do experiments to test the hypothesis.

2 Do research.

Have your child work through the steps of the scientific method. For example: Why does breakfast cereal get stale? Research why foods get stale and what can prevent that. Develop a hypothesis. Do experiments, such as leaving some cereal out and comparing it with cereal in an airtight container. Compare the results and form a conclusion.

FACTS Besides the sun, there are seven major types of object in the solar system. Many of them move in an orbit—a curved path around another object.

Draw a line from each type of object to the correct definition.



Comet



Moon



Planet



Meteor



Dwarf planet



Asteroid

A small round object that orbits the sun.

An irregularly shaped object made of rock and metal. Millions of them orbit the sun in a belt between two particular planets.

A mass of ice, rock, and dust. It orbits the sun, blazing a bright path through the sky as it nears the sun.

A large, round object that orbits the sun.

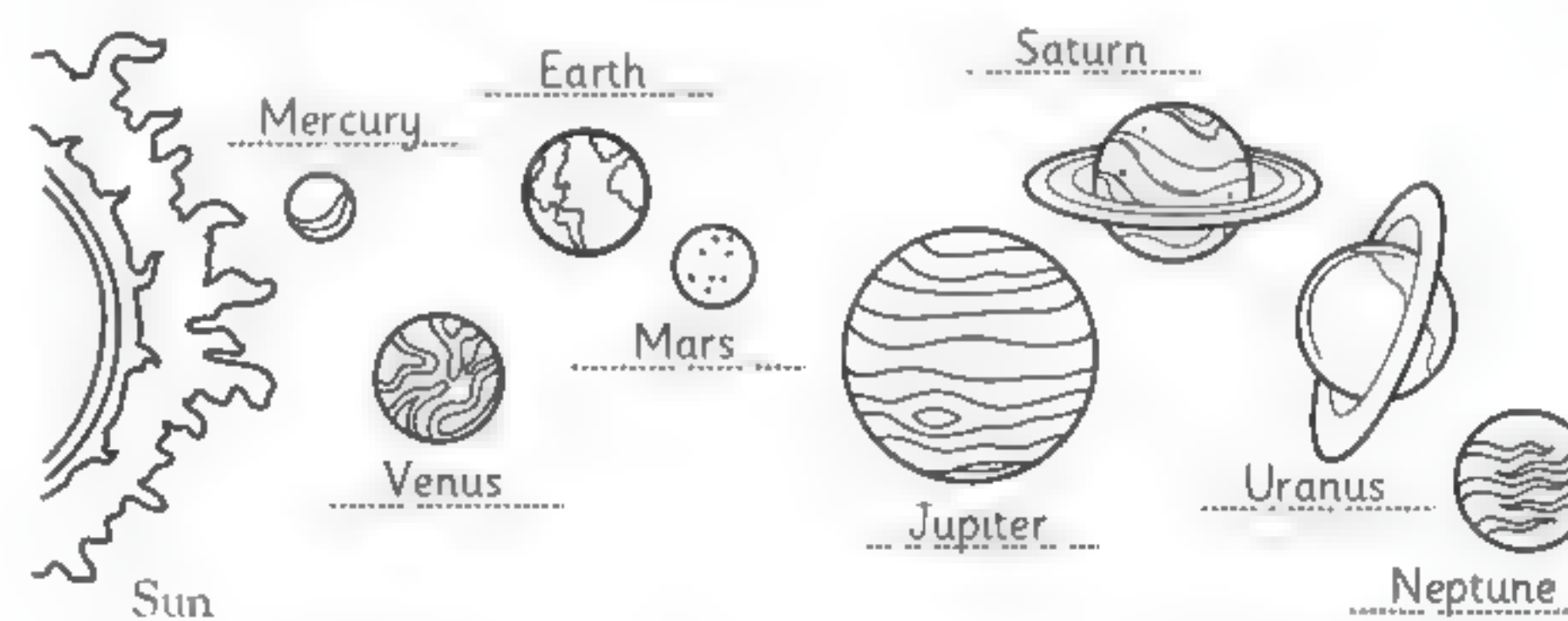
A round object that orbits a planet or a dwarf planet.

A small, rocky object. Thousands pass Earth every year. They are called meteors, or shooting stars, when they burn up in the atmosphere.

When a meteor falls to Earth and hits the ground, it is called a meteorite. The largest meteorite in the world is called the Hoba meteorite, in Namibia, Africa. Discovered in 1920, it is thought to have fallen more than 80,000 years ago. It weighs 66 tons and has never been moved.

FACTS There are eight planets in the solar system. In order from the sun, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

The planets are shown here in their order from the sun. Label each one correctly. They are not shown to scale.



Answer these questions about the planets.

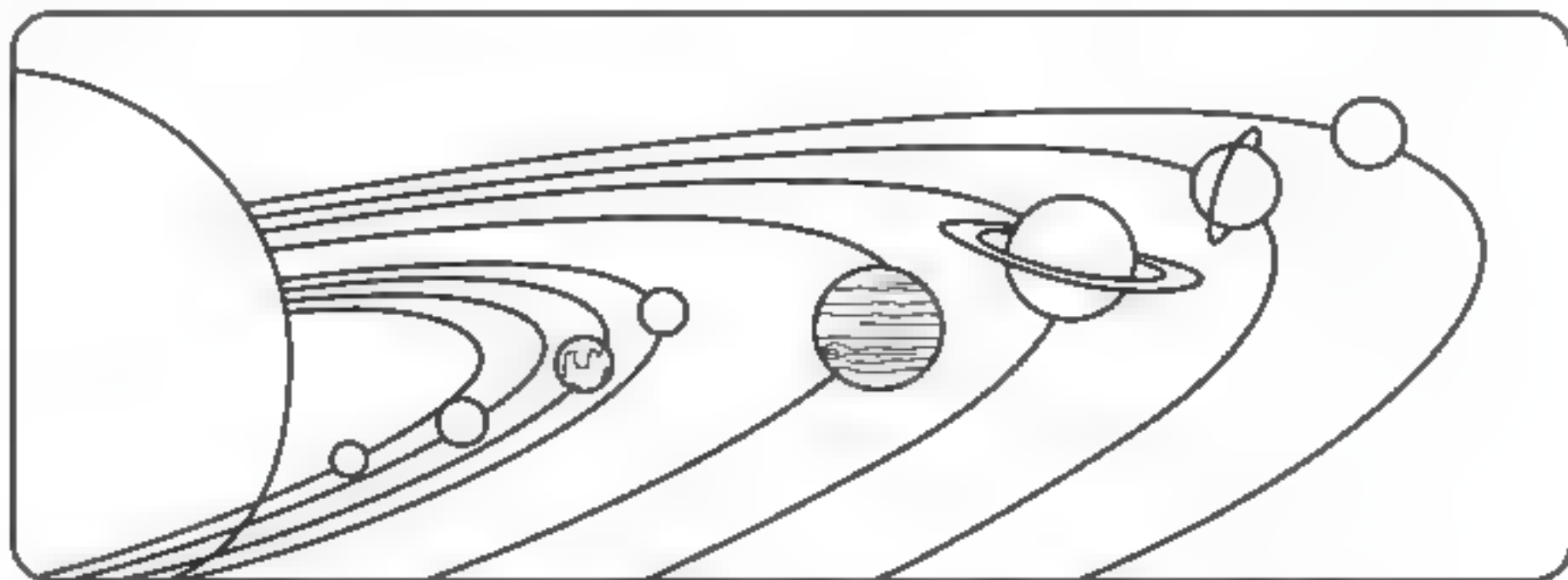
- Which is the biggest planet? Jupiter
- Which planet is nearest to the sun? Mercury
- Which planet is farthest from the sun? Neptune
- Which planet is closest to Earth? Mars
- Which planets are surrounded by rings? Saturn and Uranus
- Although this planet lies second from the sun, it is the hottest of them all. Venus
- Which planet looks tilted on its side, because its rings orbit from top to bottom? Uranus

Five of the planets are visible to the naked eye from Earth: Mercury, Venus, Mars, Jupiter, and Saturn. Of the five, Venus is the easiest to spot. It has a brilliant white light that outshines the stars around it. Together with your child, research online the current position of the five "naked eye" planets above your area, and see if you can spot them.

FACTS The solar system is the group of planets and other objects that orbit the sun, the huge star at the center. There are eight planets—four small planets close to the sun made of rock, and four large outer planets made of gas and surrounded by rings of ice, dust, and rock. The time it takes for each planet to orbit once around the sun is its year. As the planets travel, they also rotate. One complete rotation is called a day.

Use the words in the box below to complete the sentences.

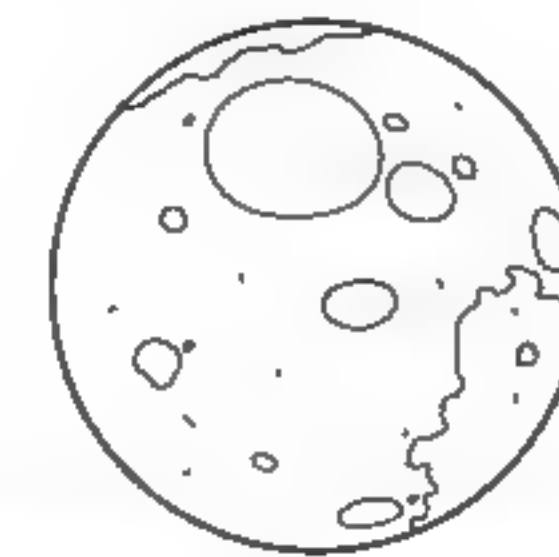
Day Gas Rings Rock Star Year



1. The sun is the star at the center of our solar system.
2. A day is the time it takes for a planet to rotate once.
3. The four small inner planets are made of rock.
4. The four giant outer planets are made of gas.
5. The outer planets have rings made of ice, dust, and rock.
6. A year is the time it takes for a planet to complete one orbit around the sun.

Astronomers call the four inner planets in the solar system terrestrial planets. The four outer planets are called the gas giants. Uranus and Neptune are sometimes called ice giants because they contain a high percentage of frozen methane and frozen ammonia. Ask your child: "If you could name the planets, what would you name them?"

FACTS A moon is a natural object that orbits a planet. In the solar system there are more than 160 known moons. Earth has just one moon, but some planets have many. Only Mercury and Venus have none. All moons are made of rock, or rock and ice, and many have surfaces marked by craters, formed by collisions with asteroids. Our moon is rocky and about a quarter the size of Earth, which it orbits every 28 days. The distance between the moon and Earth is 238,855 miles, which takes a spacecraft about 60 hours to travel.



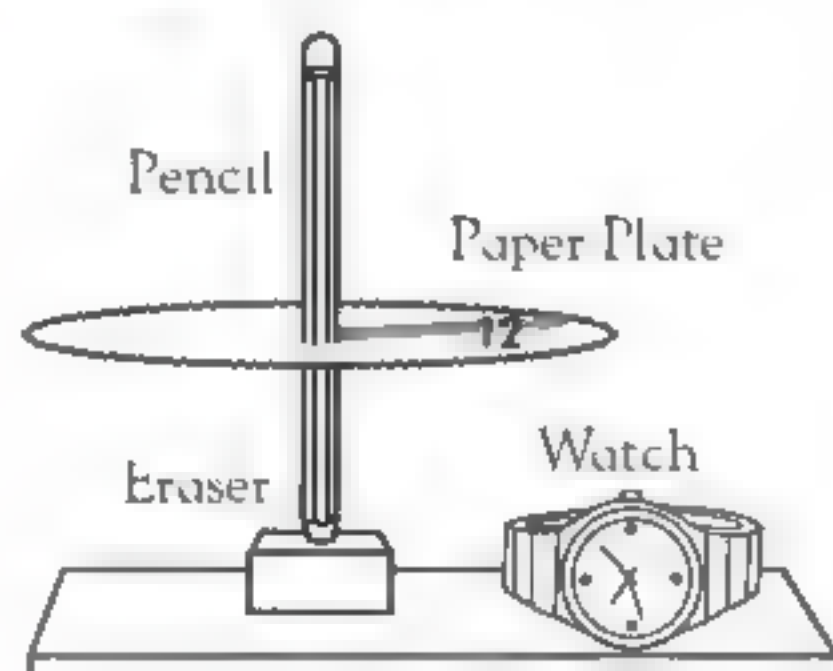
Circle the correct answer to these questions.

1. What is Earth's moon made up of?
A. Lava
B. Rock
C. Ice
2. What is the name of the thousands of marks on the moon's surface?
A. Caverns
B. Craters
C. Crevasses
3. The marks on the moon were created by collisions with what objects?
A. Asteroids
B. Meteorites
C. Planets
4. Approximately how long does it take for the moon to orbit Earth?
A. One day
B. One week
C. One month
5. How long does it take a spacecraft to travel to the moon from Earth?
A. 24 hours
B. 60 hours
C. 100 hours
6. Which of these planets does not have a moon?
A. Neptune
B. Mars
C. Venus

The astronauts who landed on the Moon brought back many rocks. The make up of those rocks suggests that the Moon was probably born when a Mars-sized object (Theia) collided with Earth billions of years ago. The collision blew a huge amount of rocky debris into space. Some of that debris clumped together to form the moon.

FACTS A sundial uses the light of the sun to tell the time of day. People have used sundials for thousands of years.

TEST What You Need:



What To Do:

1. Mark a point on the edge of the paper plate and number it 12.
2. Make a small hole in the center of the plate and gently push through the pencil. Press the point of the pencil into the eraser.
3. On a sunny day, find a place that will get direct sunlight all afternoon and evening.
4. At exactly 12 o'clock, position the plate so that the shadow cast by the pencil aligns with the mark for the number 12.

5. Use the watch to keep track of time. At 1 o'clock, mark and write 1 at the point where the pencil's shadow crosses the edge of the plate. Repeat every hour until the sun goes down.

RESULT

What happened to the shadow of the pencil?

It changed position through the day, as the sun moved across the sky.

Predict what will happen if you place the sundial in the same place the next day, and why this is useful.

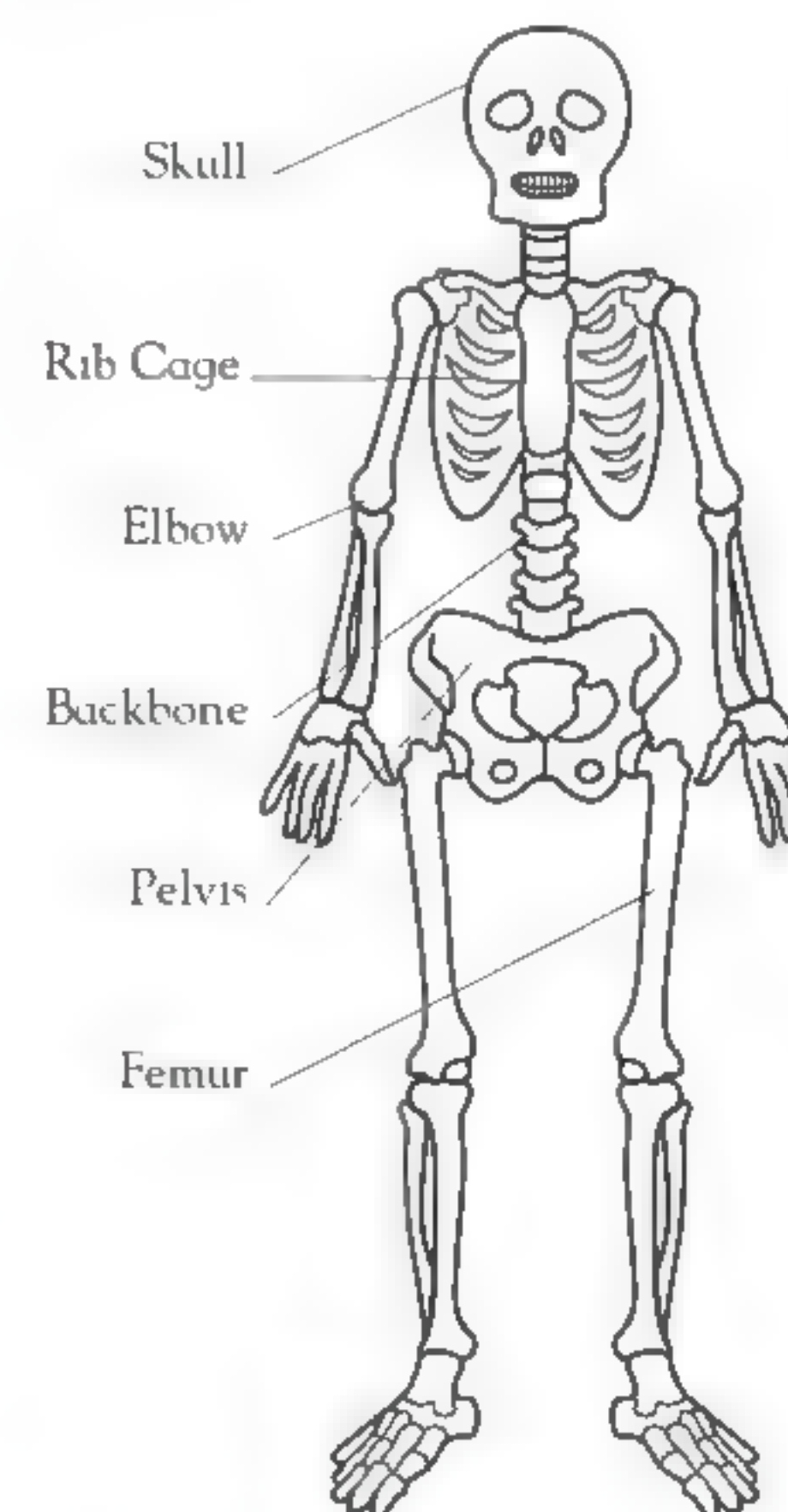
The shadow of the pencil will follow the same path around the plate, so you can use the sundial to tell the time.

The earliest known sundials date back to 1,500 BCE. Sundials have been found in ancient cultures, from the Egyptians to the Greeks and Romans. Taipei 101, in Taiwan—one of the tallest buildings in the world—is also the tallest sundial in the world today. The shadow cast by the building falls on a circular park that acts as the face of the sundial.

FACTS The human skeleton has 206 bones. It supports and shapes the body, and protects the soft internal organs.

Look at the picture and use the words in the box to complete the sentences.

Backbone Elbow Pelvis Rib Cage Skull Femur



1. The bones of the upper arm and forearm meet at a joint called the elbow.
2. The rib cage protects the heart and lungs.
3. The skull protects the brain.
4. The backbone protects the spinal cord.
5. The pelvis protects the organs of digestion and reproduction.
6. The femur is the longest bone in the body.

Bones contain a spongy tissue called bone marrow. It produces several components of the blood: red blood cells, white blood cells, and platelets. Red blood cells transport oxygen, white blood cells fight infections, and platelets help the blood clot. Whenever the body suffers a cut or bruise.

★ Types of Muscle

We have different types of muscle in our bodies. We can control some of them, like the muscles in our arms and legs. These are called voluntary muscles. Others we can't control, like the muscles that automatically help us breathe, eat, and pump our heart. These are called involuntary muscles.

Write V next to each activity that is controlled by voluntary muscles and I next to each activity that is controlled by involuntary muscles.



- | | |
|---|---|
| <input type="checkbox"/> Talking | <input type="checkbox"/> Bicycling |
| <input type="checkbox"/> Walking | <input type="checkbox"/> Heart rate |
| <input type="checkbox"/> Digestion of food | <input type="checkbox"/> Shivering |
| <input type="checkbox"/> Playing a musical instrument | <input type="checkbox"/> Circulation of blood |

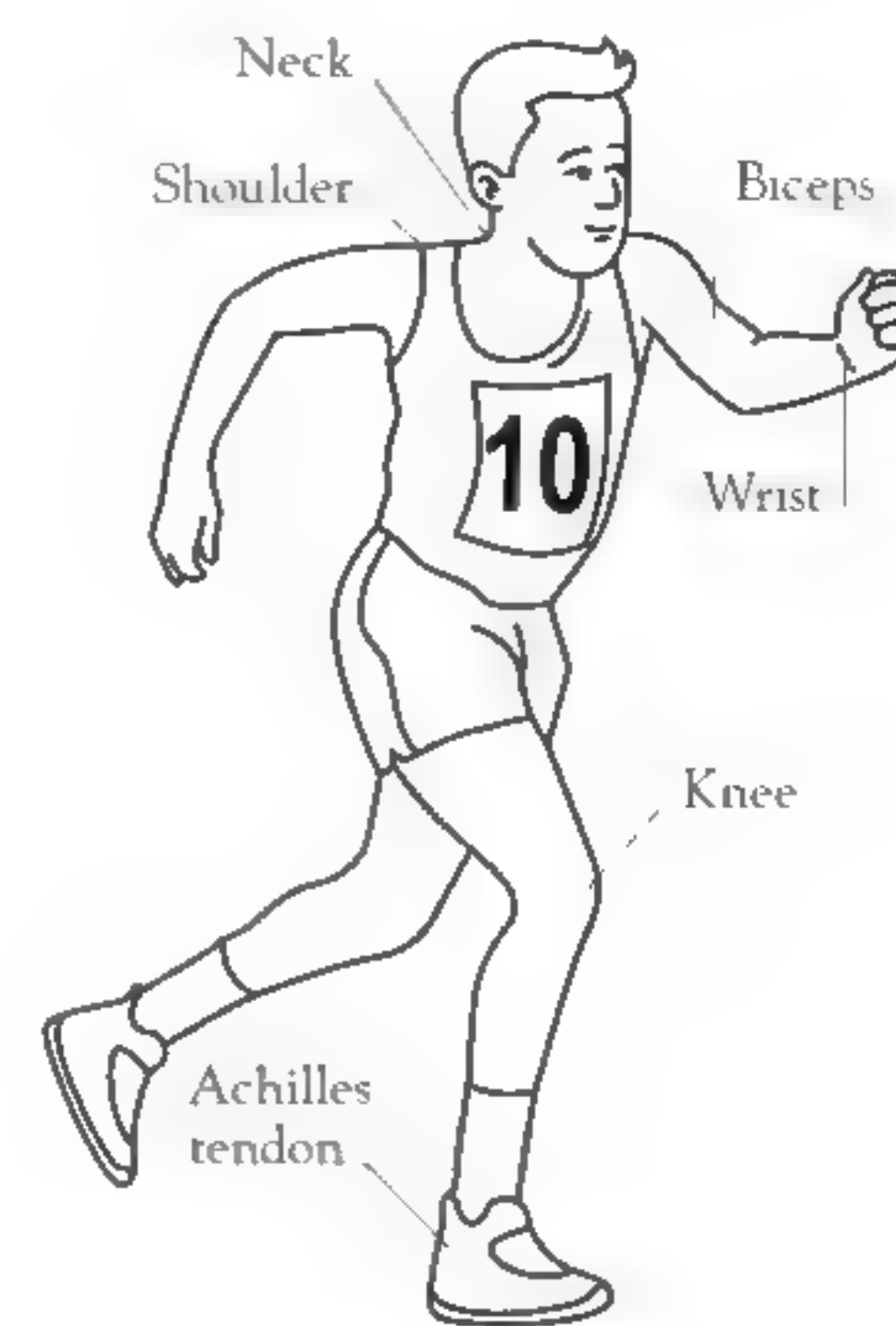
There is a third type of muscle—called cardiac muscle—that makes up your heart. This is a special muscle tissue that never gets tired. It allows your heart to pump all day. Have your child lift a book over their head repeatedly. Ask them if their arm gets tired. What do they think would happen if their heart tired in the same way?

How the Body Moves ★

Muscles are attached to bones by strong fibers called tendons. The muscles and tendons pull on the bones to make the body move. Where two bones meet is called a joint. There are different types of joint, which allow movement in different ways.

Look at the picture and use the words in the box to complete the sentences.

Achilles tendon Biceps Knee Neck
Shoulder Wrist



- The joint where the hand meets the forearm is called the wrist.
- The Achilles tendon attaches the leg bone to the heel.
- The knee joint, where the leg bones meet, moves like a hinge.
- The muscle at the front of the upper arm is called the biceps. It helps raise the forearm.
- A joint in your neck lets you turn your head from side to side. It is called a pivot joint.
- The shoulder joint allows you to swing your arm in many different directions. It is called a ball and socket joint.

Muscles work in pairs. The muscle at the front of the upper arm is called the biceps. The muscle at the back of the upper arm is called the triceps. When you lift something using your upper arms, your biceps tighten and your triceps relax. When you lower the object, the biceps relax and the triceps tighten.

★ The Heart

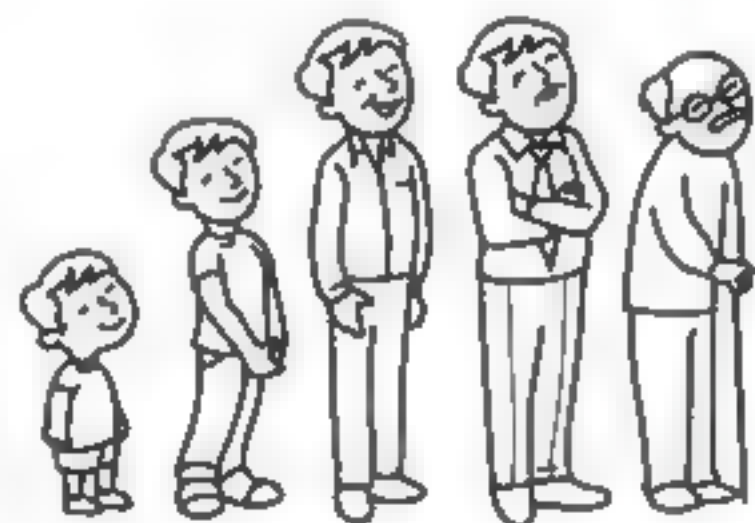
The heart is the body's hardest-working muscle. It never stops pumping blood around the body. You can feel the pumping as your heartbeat, or pulse. Each pulse equals one beat of the heart. The number of heartbeats per minute is your heart rate.

TEST What You Need:



Stopwatch

Five people of very different ages, from your friends to your grandparents.

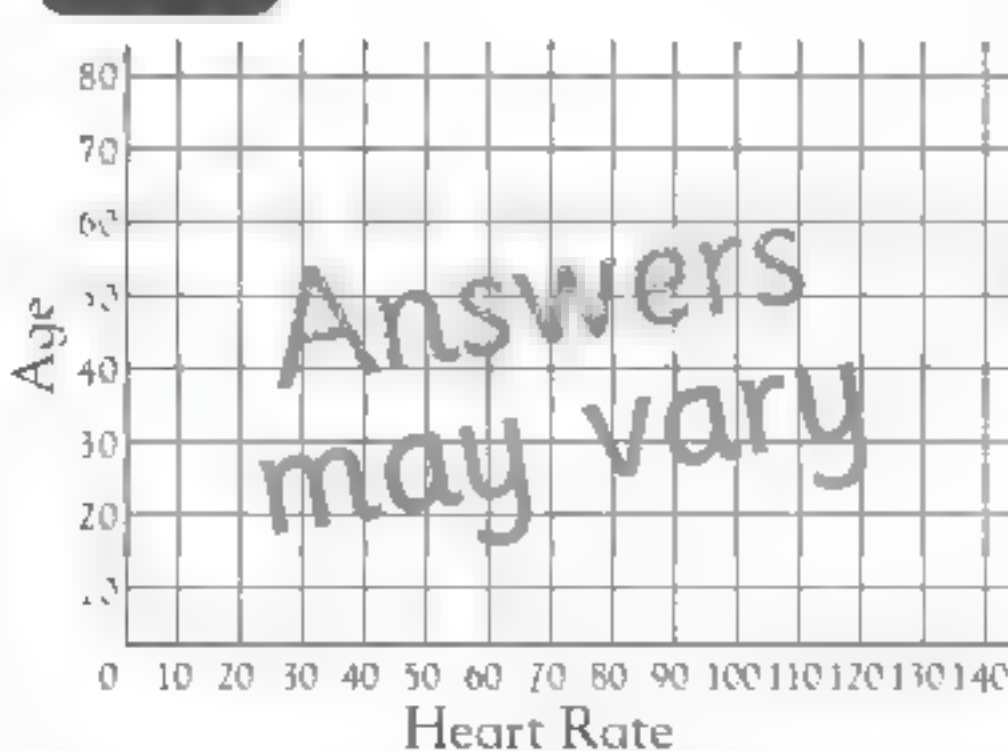


What To Do:

- Measure the pulse of each person. You will find it on the neck, just below the jaw. Count the number of beats in 15 seconds and then multiply the number by 4.
- Plot the heart rate of each person on the chart below, then connect the dots.



RESULT



What does the line connecting the dots tell you about the human heart?
Answers may vary

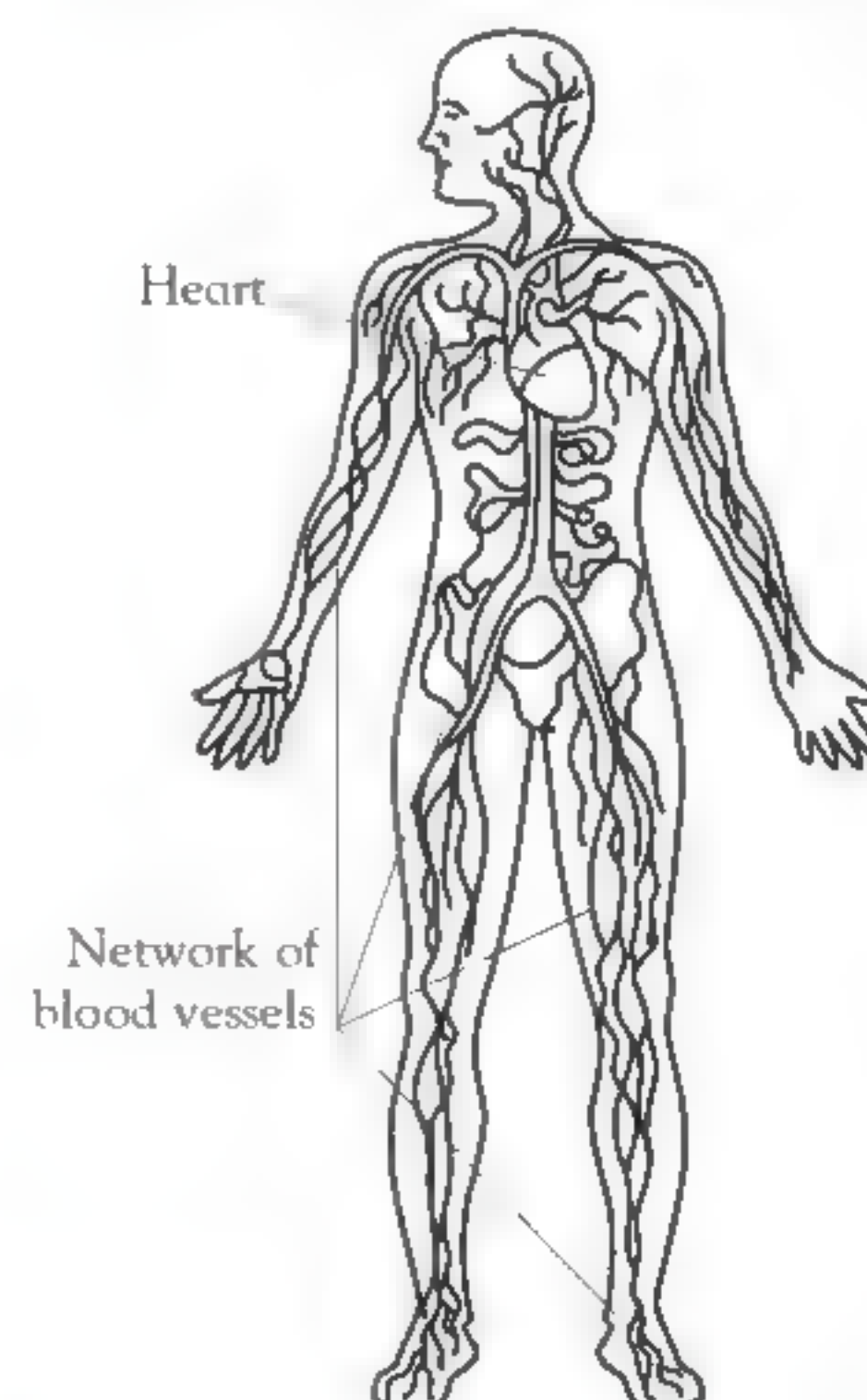
The heart changes how quickly it pumps blood based on the body's activity. Have your child repeat the activity on this page, but this time have them take their heart rate while sitting quietly, then after walking for 1 minute, then after running for 1 minute, then after sitting quietly for 5 minutes. Record the results on a chart.

Circulation ★

The continuous movement of blood around the body is called circulation. The heart pumps the blood through a network of blood vessels. Blood pumped out of the heart has come from the lungs, and is rich in oxygen. The blood delivers oxygen to cells all over the body and picks up waste products, such as carbon dioxide, then returns to the heart. There are two types of blood vessels: arteries carrying blood from the heart to the body, and veins carrying blood back to the heart.

Use the words in the box below to complete the sentences.

Arteries Carbon dioxide Heart Lungs Oxygen Veins



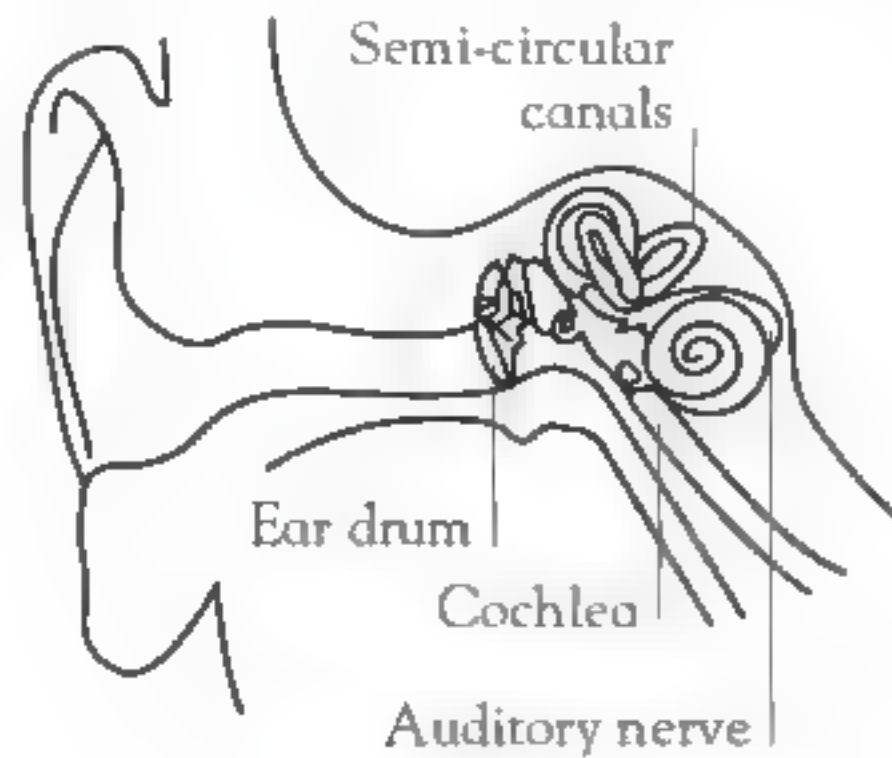
- The blood is pushed around the body by the pumping action of the heart.
- Blood vessels that take blood from the heart around the body are called arteries.
- Blood vessels that carry blood from the body back to the heart are called veins.
- Blood picks up oxygen from the lungs, and transports it to the cells all over the body.
- Cells release waste products, such as carbon dioxide into the blood.

The lungs are part of both the respiratory (breathing) system and the circulatory system. The lungs absorb oxygen from inhaled air and release it into the blood. The blood carries that oxygen to the body's cells, which release carbon dioxide as a waste product. The blood carries that carbon dioxide back to the lungs to be exhaled.

Sound travels through the air in waves of pressure. These sound waves pass into the ear and vibrate a thin skin, called the eardrum. This is linked to three tiny bones (the hammer, anvil, and stirrup) that make the vibrations louder and pass them on to a coiled tube filled with fluid, called the cochlea. Here the vibrations are turned into electrical signals that travel to the brain along the auditory nerve. Three tubes also in the ear, called the semi-circular canals, detect head movements to help control balance, and tell you which way up you are.

Use the words in the box to complete the sentences.

Anvil Brain Eardrum Hammer Pressure
Semi-circular canals Stirrup



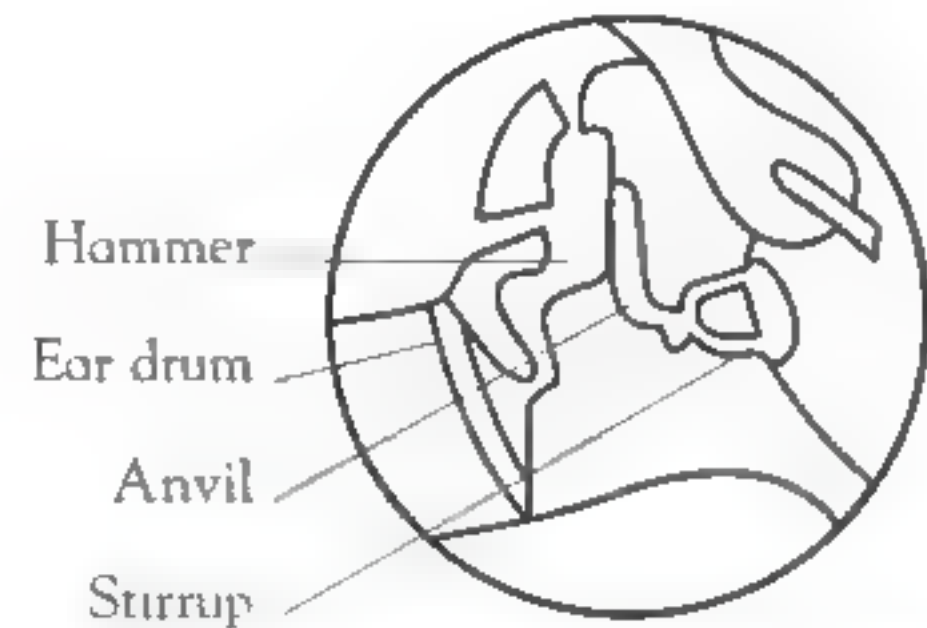
1. The ear detects waves of pressure called sound waves, which travel through the air.

2. The eardrum is a thin skin in the inner ear that vibrates when sound waves meet it.

3. Three bones, the hammer, anvil, and stirrup make the sound waves louder. They are the smallest bones in body.

4. The brain is able to identify the type, pitch, volume, and direction of a sound from electrical signals.

5. The ear also contains three small tubes, called the semi-circular canals that help you balance, and tell you which way is up, and which is down.



The ear has many different parts that perform many different functions. It is a very delicate tool that should be protected from loud noises. We've introduced the common names of the three little bones that amplify hearing, collectively called the ossicles. The Latin names are malleus (hammer), incus (anvil), and stapes (stirrup).

The skin has two layers: the waterproof outer layer, called the epidermis, which protects the body from germs and the sun, and the dermis, which contains blood vessels. The skin also helps control body temperature. When we are cold, we get goosebumps as hairs in the skin rise to trap a layer of warm air. When we are hot, it releases sweat to cool the body from tiny openings called pores. Nerves in the skin give us our sense of touch.

Use the words in the box to complete the sentences.

Dermis Epidermis Germs Goosebumps Nerves Pores



1. The skin protects the body from germs and harmful rays from the sun.

2. The outer layer of the skin is called the epidermis.

3. The inner layer of the skin is called the dermis.

4. Nerves in the skin enable us to feel things when we touch them.

5. The tiny openings in the skin, called pores, release sweat to cool the body.

6. When we are cold, the skin gets goosebumps.

Different parts of your body are more sensitive to touch than others. Tell your child to close their eyes. Take a cool spoon and gently touch one of their fingers. Do they feel it? Now touch the middle of their heel, then their elbow, knee, and forehead, and have them chart the differences. Which part of the body felt the cold most? The least?

A vertebrate is an animal that has a backbone. Mammals, birds, reptiles, amphibians, and fish are all vertebrates.

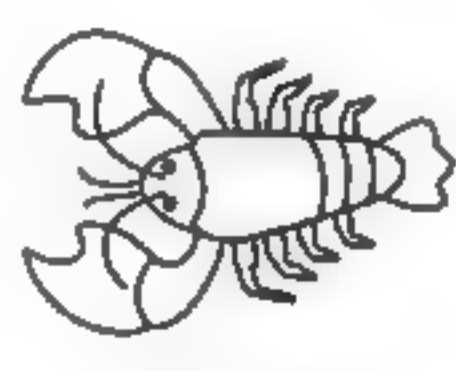
Circle all of the animals that are vertebrates.



Bird



Frog



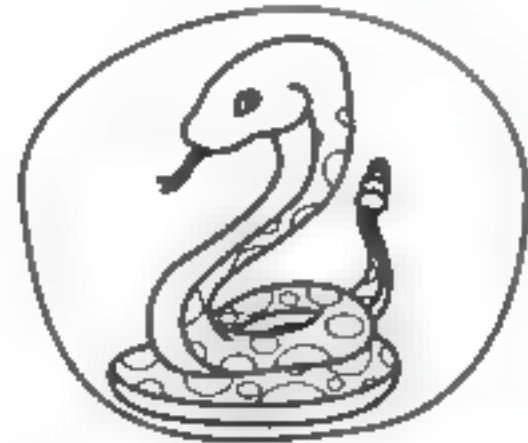
Lobster



Jelly fish



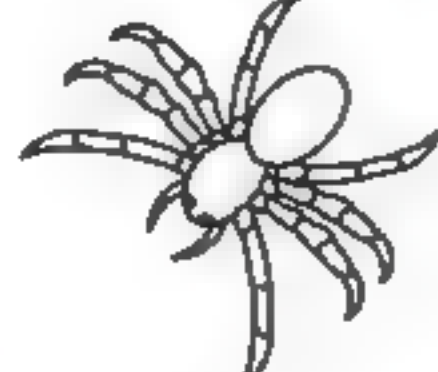
Human



Snake



Earthworm



Spider

Vertebrates and invertebrates are all around us. Have your child make a chart of all the vertebrates and invertebrates they see in one day. Don't forget the household insects that cross their paths.

An invertebrate is an animal that does not have a backbone. Insects, worms, and mollusks (such as snails) are invertebrates. Most of the animals on Earth are invertebrates.

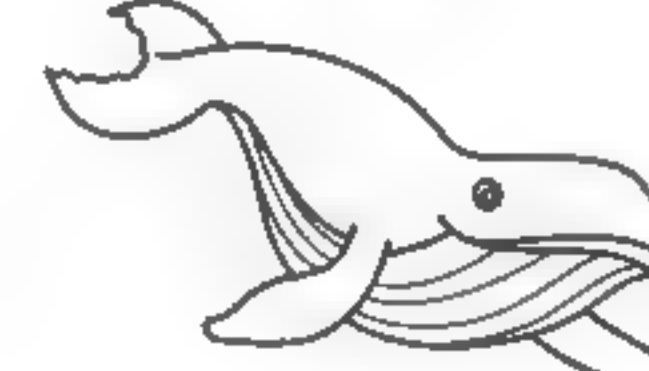
Circle the animals that are invertebrates.



Eel



Clam



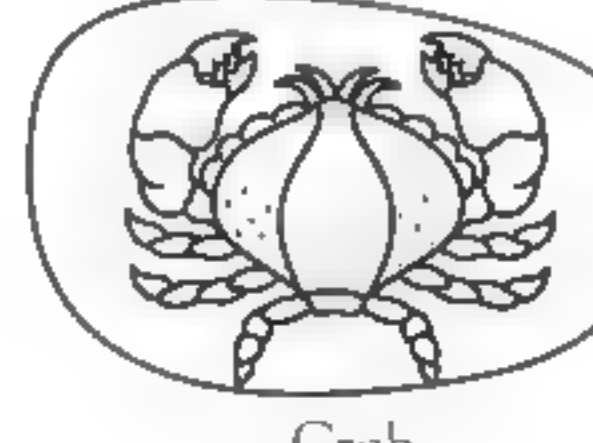
Whale



Dolphin



Grasshopper



Crab



Scorpion



Koala

Together take a field trip to a local park, playground, woodland, or zoo, to see how many species your child can identify. How many different invertebrates have they seen? How many different vertebrates? Does one type outnumber the other?

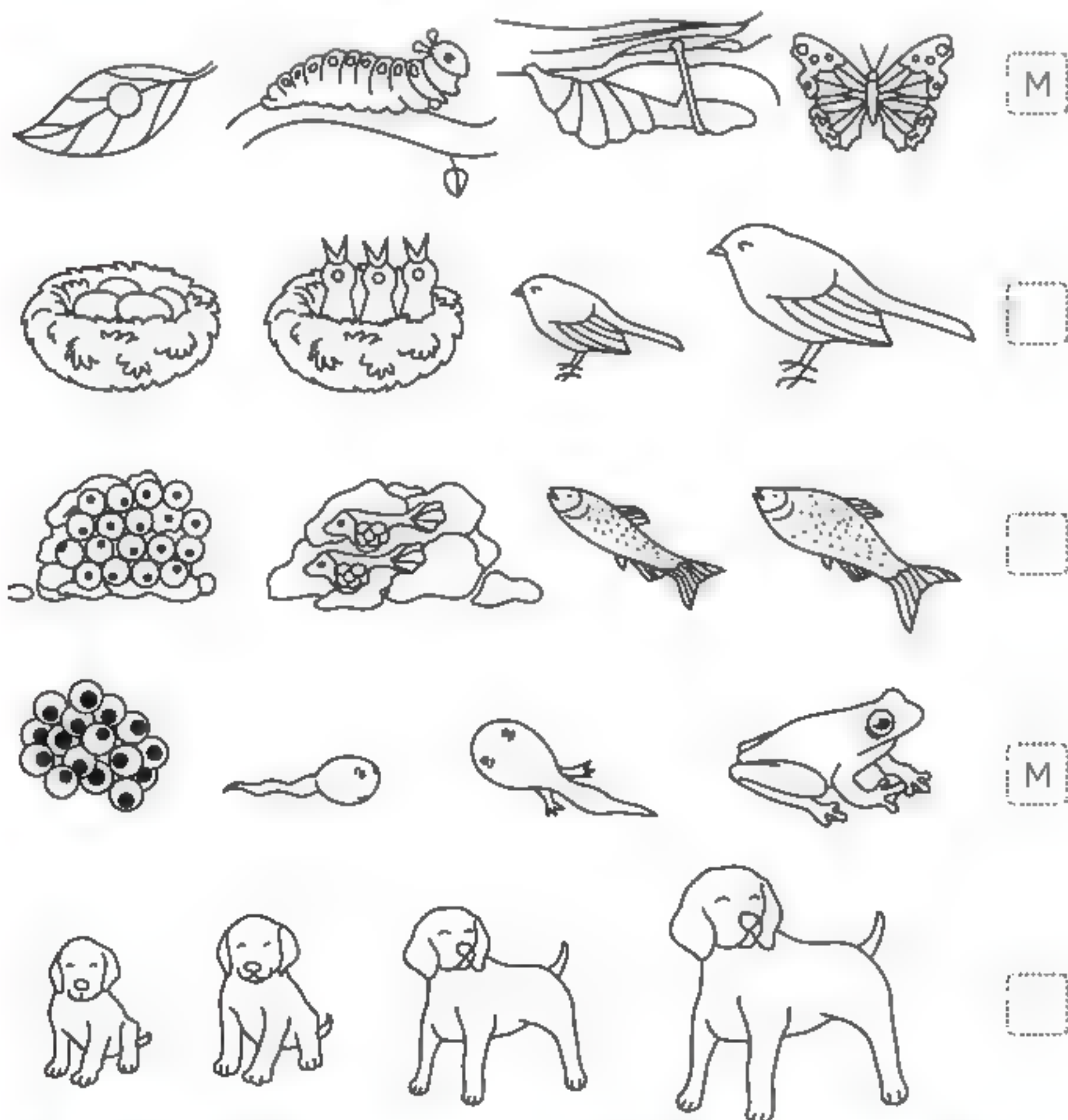


Metamorphosis

FACTS

All animals pass through different stages of life as they grow into adults. But for some animals, they completely change form as they grow. This is called metamorphosis.

Look at the life cycles of the animals below and write **M** in the boxes of the two that are examples of metamorphosis.



Animal Groups



FACTS

Animals are divided into groups that share key characteristics.

Draw a line between each description of an unusual animal and the details of the animal group it belongs to.



Tuatara

Mammals have fur or hair and feed milk to their young.

The cassowary stands almost 6 ft tall. It lays eggs and has feathers.

Reptiles have scaly skin and lay eggs.

The sugar glider spreads its body like a kite and glides from tree to tree. It has fur.

Birds lay eggs and have feathers.

The aha ha lays eggs and has wings, but has no backbone.

Fish have scales, lay eggs, and have gills that enable them to breathe in water.

The tuatara is scaly, lays eggs, and can live to be more than 100 years old.

Insects have no backbone. They lay eggs, have six legs, and many have wings.

The humuhumunukunuaopua is brightly colored, grunts like a pig, and has gills.

Marsupials are a special group of mammals that raise their young in a pouch. Most marsupials live in Australia, where kangaroos, wallabies, wombats, and koalas are found. Several marsupials live in South America, but just one in North America—the opossum.

Use the words in the box to complete the sentences.

Australia Milk Kangaroo North America Koala Pouch

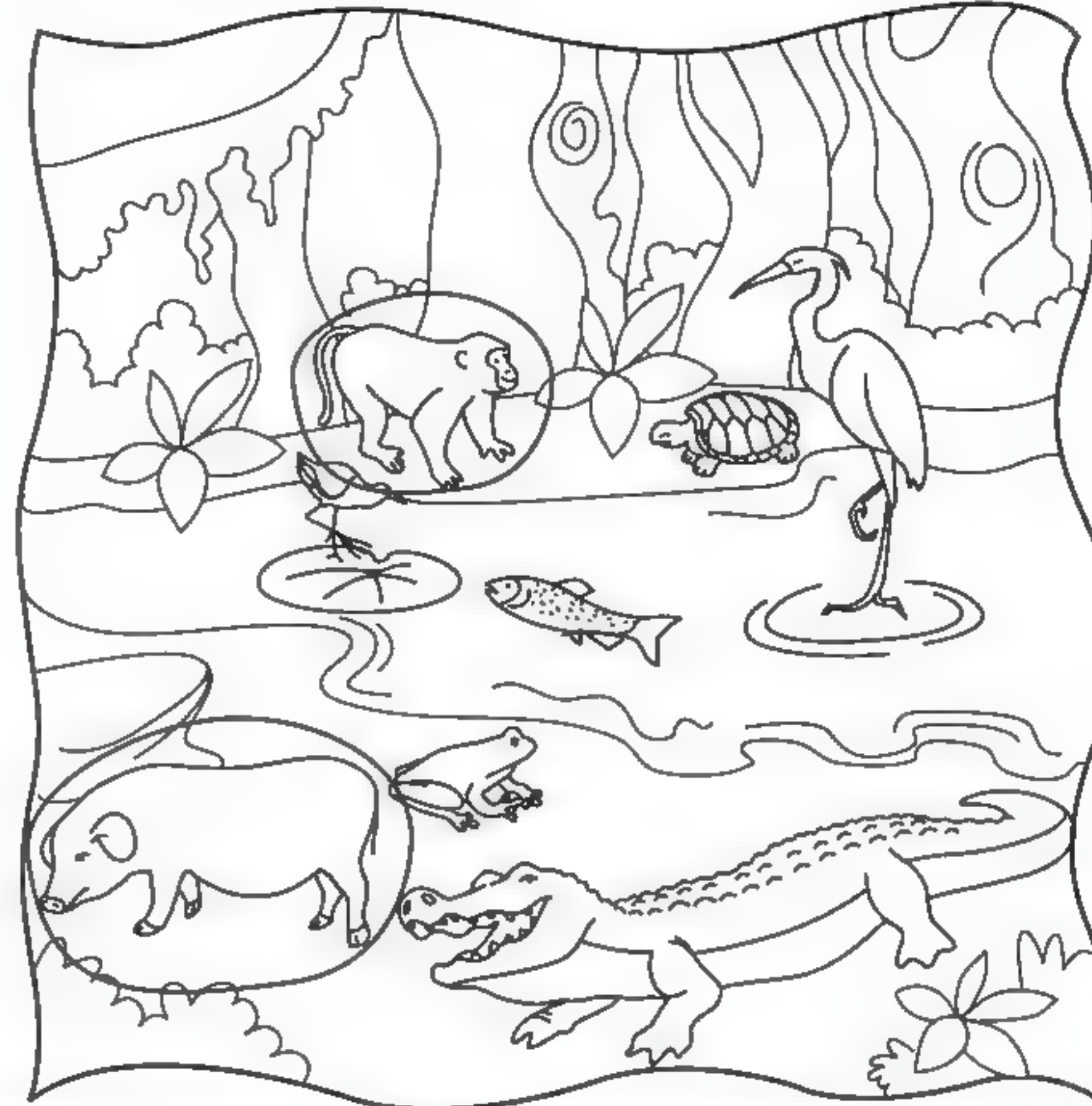


1. Marsupials are unusual mammals because they carry their young in a pouch.
2. Like most mammals, marsupials have fur and feed their young on milk.
3. Most marsupials live in Australia.
4. The opossum is the only marsupial in North America.
5. The biggest marsupial is the kangaroo.
6. Although it is often called a bear by mistake, the koala is in fact a marsupial.

Australia is home to another group of unique mammals, the monotremes. Like other mammals, they have hair and provide milk for their young. But instead of giving birth to live young, monotremes lay eggs. There are two members of this group of animals: the platypus and echidna.

A wetland is a flooded area that is usually a mix of open water and areas of dense vegetation. It is a habitat rich in wildlife. The water is full of swimming animals, and the trees and reeds are home to the many birds that feed off them.

Look at the animals in the picture and think about how they are adapted to living in a wetland habitat. Circle the two animals that do not live there.

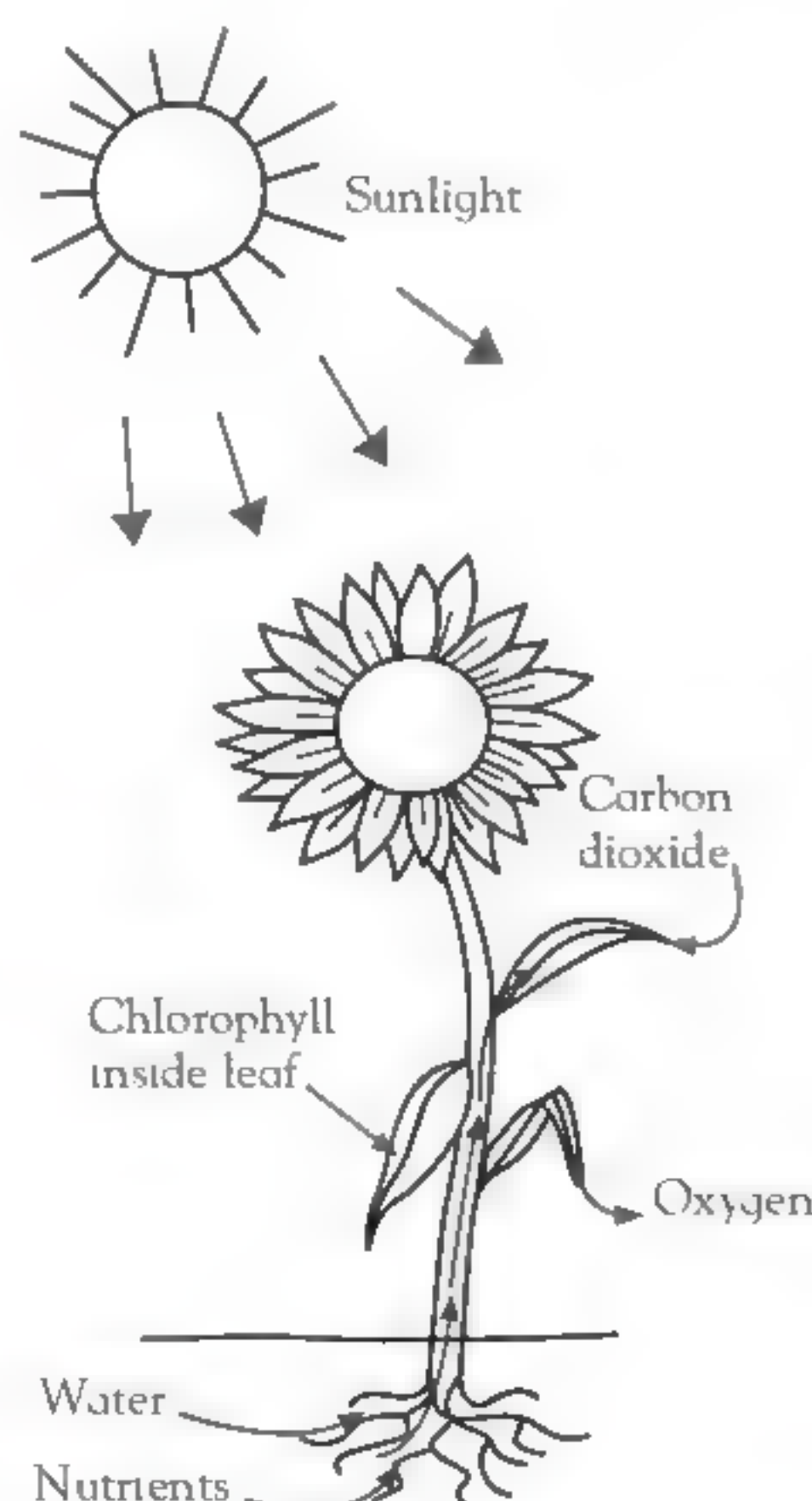


Wetlands are areas where the soil is wet or water covers the soil. There are many different types of wetland: marsh, bog, fen, swamp, mire, slough, and prairie pothole. Is there a wetland near you? Ask your child to identify what animals and plants live in it. What animals and plants are absent? Why do they think that is?

Plants use the energy from sunlight to make food from carbon dioxide and water in a process called photosynthesis. Most food is made in the leaves.

Use the words in the box to complete the sentences.

Carbon dioxide Chlorophyll Food Nutrients
Oxygen Sunlight Water



1. Plants use energy from sunlight to make food.
2. A green substance in leaves, called chlorophyll, traps the energy.
3. Carbon dioxide enters the plant through tiny holes on the underside of the leaves.
4. The roots supply water and nutrients.
5. Food travels from the leaf to all parts of the plant.
6. Oxygen is released from the leaf through holes in the underside.

A critical part of photosynthesis is a plant's use of carbon dioxide. Carbon dioxide is a waste gas for humans, but is crucial to a plant. By consuming carbon dioxide, green leaves help keep carbon dioxide levels in our atmosphere down, which is good for our planet.

Liquids can be measured in pints and fluid ounces (fl oz), or liters and milliliters (ml).

Study the measuring cup of water and then answer the questions.

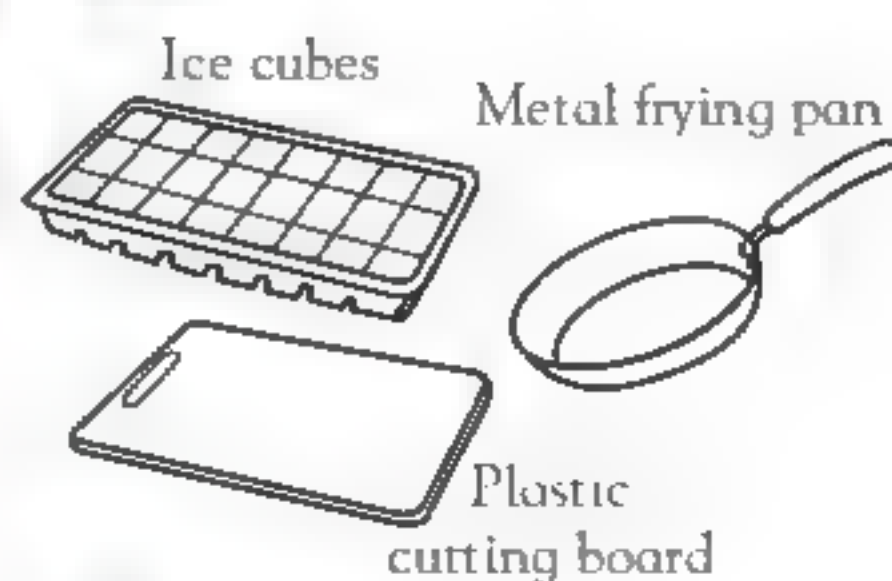


1. How much water is in the measuring cup, in milliliters? 400 ml
2. How much water is in the measuring cup, in fluid ounces? 14 fl oz
3. How many fluid ounces is 200 ml equal to? 7 fl oz
4. One pint is 20 fl oz and half a pint is 10 fl oz. How many milliliters is 10 fl oz? 290 ml
5. One liter is 1,000 ml, so half a liter is 500 ml. How many fluid ounces is 500 ml? 17 fl oz
6. How many milliliters is 5 fl oz? 147 ml

There are many different units we can use to measure something. The most common are the US customary system (inches, pounds, and ounces) and the metric system (centimeters, kilograms, and grams). While that can be confusing, it's good to learn the common conversions between them.

Conduction is one way that heat moves through a material. Some materials, like metals such as steel and aluminum, conduct heat well. Other materials do not conduct heat well.

TEST What You Need:



What To Do:

1. Press your hand against the surface of the frying pan and then the surface of the cutting

board. In the table below, describe how each one feels to the touch.

2. Ask yourself what would happen if you placed an ice cube on both surfaces? Would the ice cube on the board melt first, or the ice cube in the pan? Make a prediction and put a check (✓) on the table next to the surface you think will melt the ice cube quicker.

3. Test your prediction. Place an ice cube on each surface and observe what happens.

RESULT

Material	How Does it Feel?	Predicted Result	Result
Metal pan	Colder than the plastic board	(✓)	(✓)
Plastic board	Warmer than the metal pan		

Look at the table and explain the result.

Metal is a better conductor of heat than plastic. It feels cooler than plastic because it conducts heat away from your hand. Also, heat from the air moves faster through metal, melting the ice cube quicker.

Have your child try this activity with other materials (wood, concrete, glass, ceramics). How do they compare with metal and plastic as conductors of heat?

A thermometer is an instrument used to measure temperature. This may be measured in degrees Fahrenheit (°F), or degrees Celsius (°C).

Study the thermometer and then answer the questions.

1. What is the temperature reading in degrees Fahrenheit?

50°F

2. What is the temperature reading in degrees Celsius?

10°C

3. How many degrees Fahrenheit is 40°C?

104°F

4. How many degrees Celsius is 100°F equal to?

38°C

5. How many degrees Celsius is -22°F equal to?

-30°C

6. How many degrees Fahrenheit is 0°C equal to?

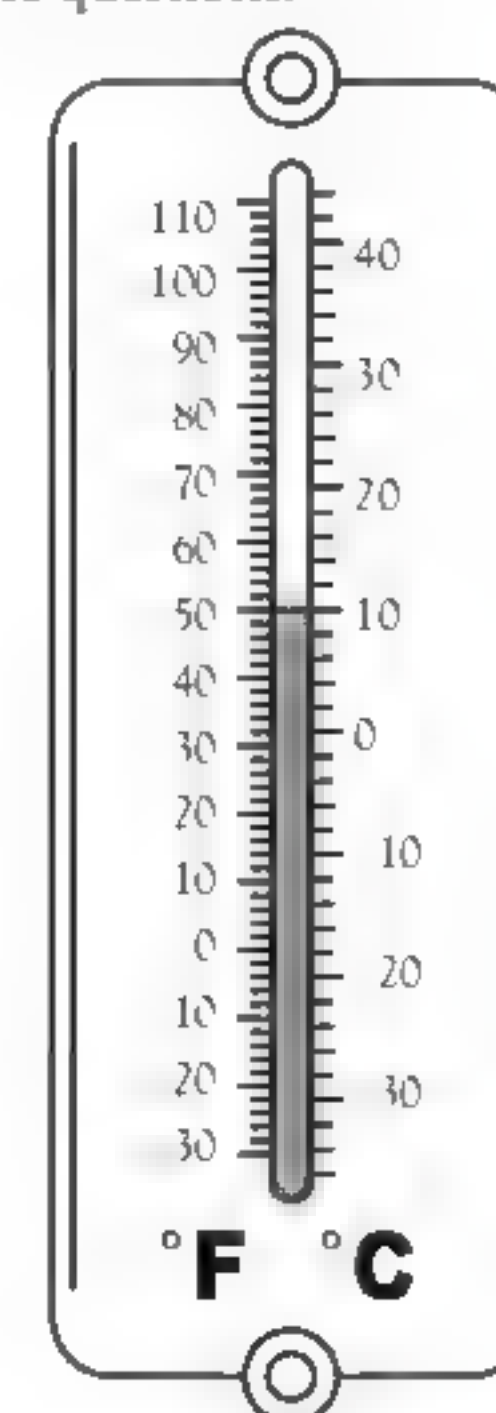
32°F

7. How many degrees Celsius is 0°F equal to?

-18°C

8. How many degrees Fahrenheit is 20°C equal to?

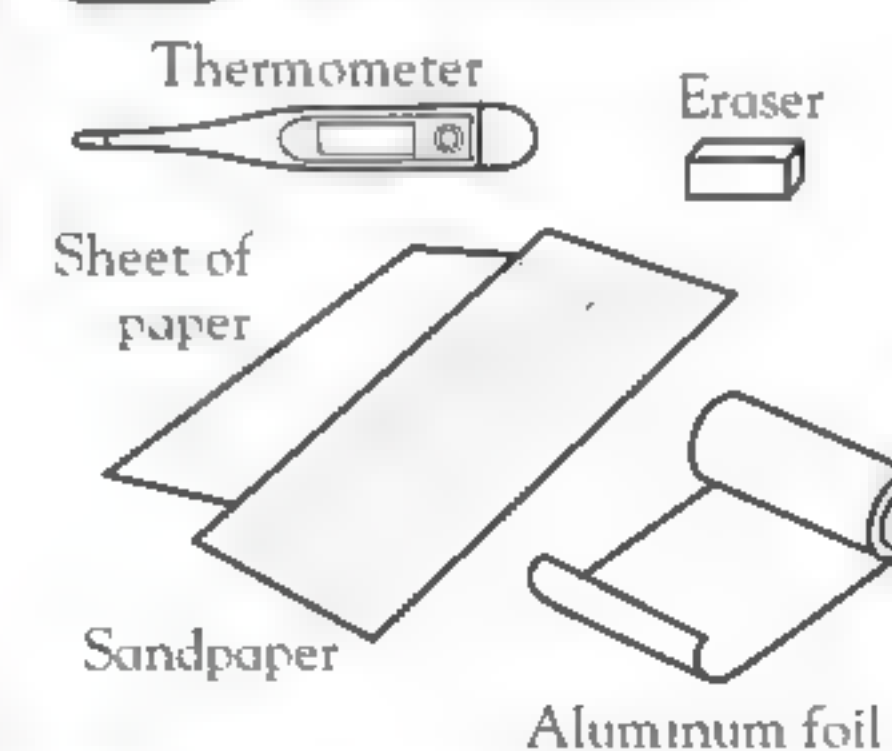
68°F



Have your child use an outdoor thermometer to record the temperature every morning and every evening for one week. Make sure they read the thermometer at the same time each day and record the results on a chart. What trends do they notice? Do they think the thermometer is a useful tool?

Friction is a force that occurs when the surfaces of two objects rub against each other. It produces heat.

TEST What You Need:



What To Do:

1. Gently press the eraser against the bulb of the thermometer and hold it there for 15 seconds. Record the temperature in the table below.

2. One at a time, rub the eraser against the surface of each of the papers and the foil, and measure the temperature of the eraser.

RESULT

Predict what you think will happen to the temperature of the eraser when you rub it against the surfaces of the other materials.

Rubbing the eraser will make it hotter.

Enter your results in the table.

Surface	Temperature
Eraser	
Rubbed on paper	
Rubbed on sandpaper	
Rubbed on foil	

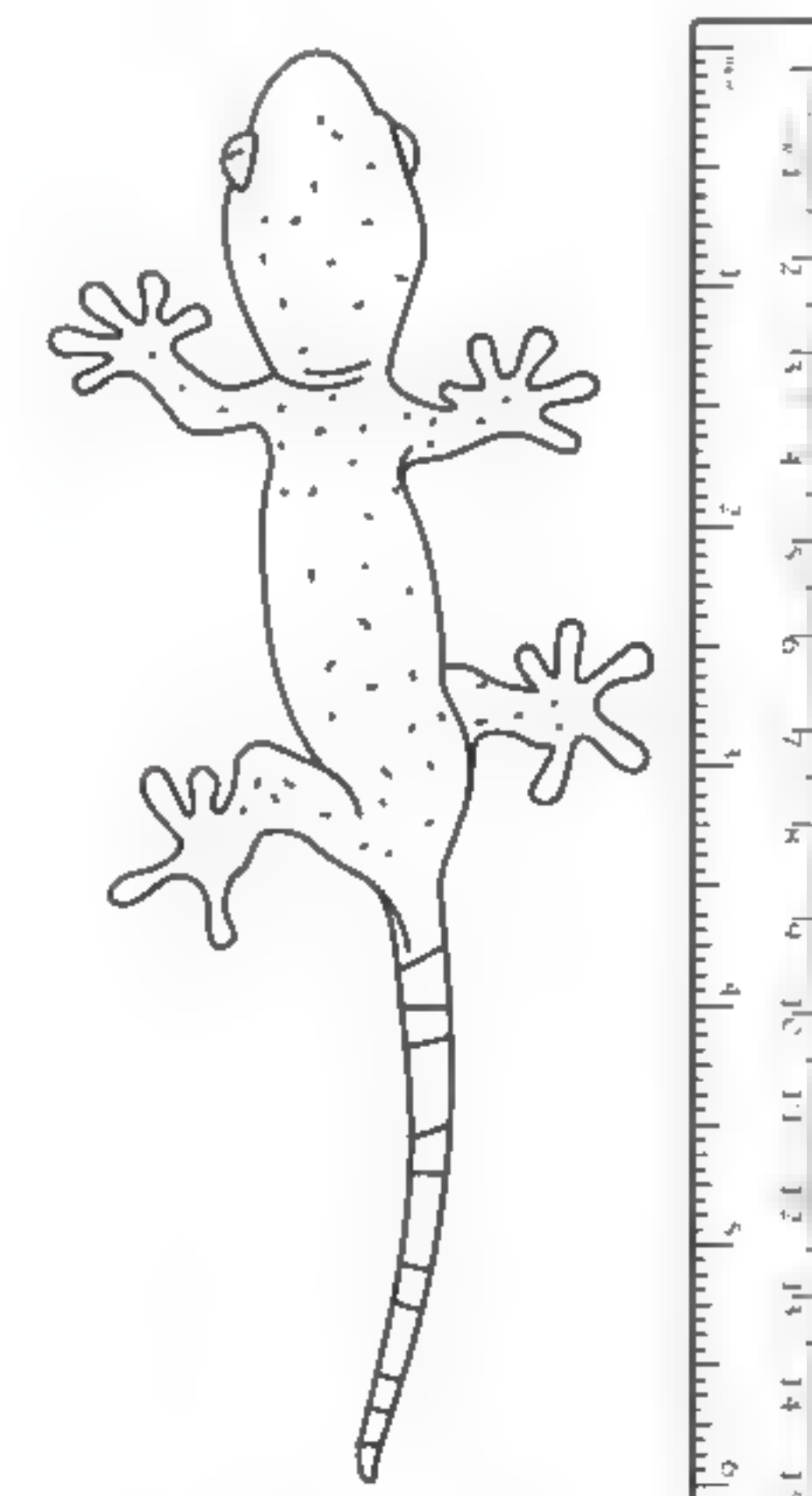
Explain the results in the table.

Rough surfaces generate more heat than smooth surfaces.

Ask your child to imagine a world with no friction. Every time they picked up a glass to drink water, it would slip through their hands. Make them list down everyday tasks where friction is critical. Include things they do at home, at school, in sports, and with friends. How would their life be different without friction? Would it be better or worse?

The size of an object—its height, width, or length, can be measured in feet (ft) and inches (in.), or in meters (m), centimeters (cm), and millimeters (mm). One foot equals 12 in. One meter equals 100 cm, or 1,000 mm.

Study the ruler and then answer the questions.



1. How long is the lizard in centimeters?

15 cm

2. How long is the lizard in inches?

6 in.

3. How many inches are equal to 9 cm?

3.5 in.

4. How many centimeters are there in 3 in.?

7.7 cm

5. How many millimeters are there in 1 in.?

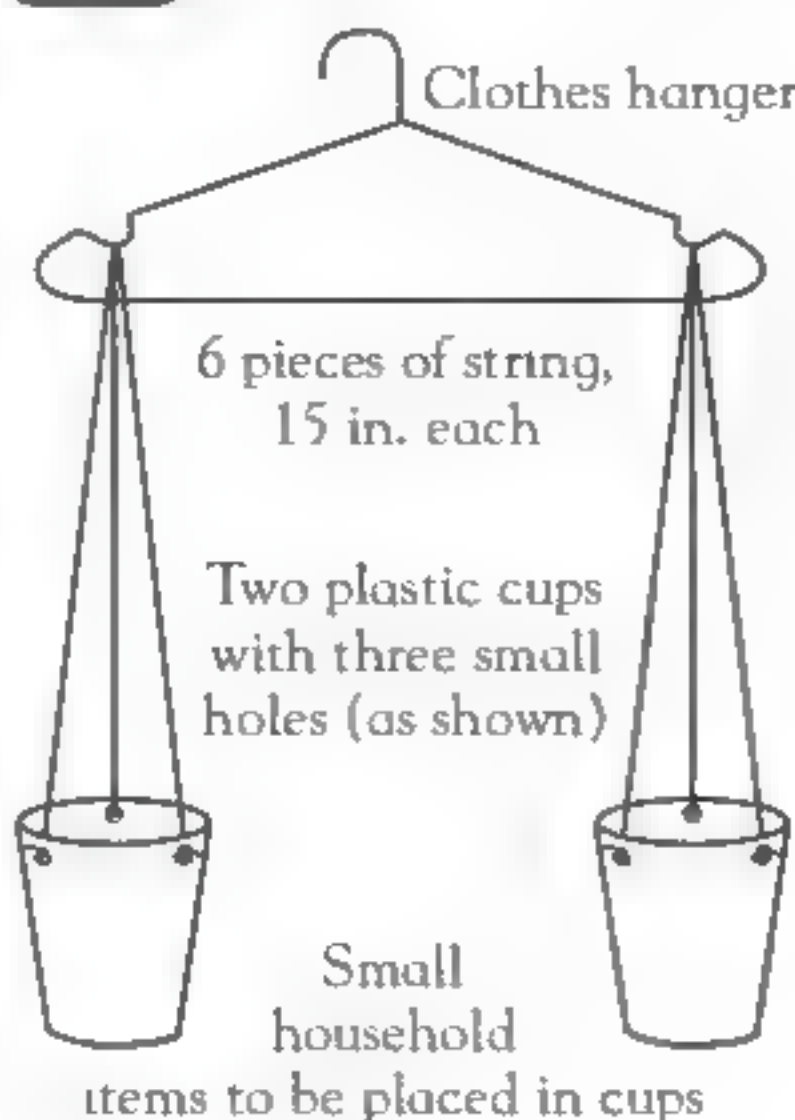
26 mm

6. How many inches are equal to 102 mm?

4 in.

Have your child collect a series of small items from around the house. Have them estimate how long each item is. Then have them measure each item, and record the results in a chart. Were their estimates close to the actual lengths?

Matter is the name used to describe all the different material that makes up the universe. The amount of matter in an object is called its mass. The amount of space that matter takes up is called its volume.

TEST What You Need:**What To Do:**

1. Thread one end of a 15 in. length of string through a hole in one cup and tie it. Repeat for the other two holes.
2. Tie together the loose ends of the three pieces of string, then hang from one end of the hanger.
3. Repeat these steps for the other cup to make a balance.
4. Hang the balance from a doorknob. The bottom of the cups should be level, and hover above the floor.
5. Add items to each cup and compare their mass. An item with greater mass will weigh a cup down more than an item with less mass.

RESULT

Predict which items have more mass. Were your predictions correct?

Item in Left Cup	Item in Right Cup	Prediction of Result	Result

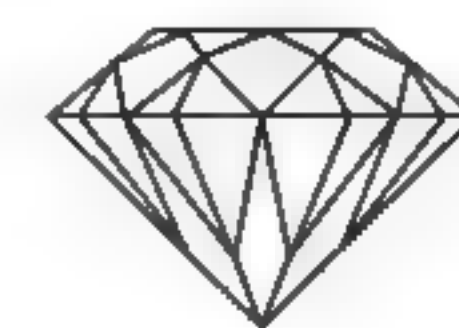
Answers may vary

Mass is the amount of matter in an object whereas weight is the measure of gravity pulling down on mass. Your mass is always the same no matter where you are. Your weight varies, however. On the moon, you weigh much less than you do on Earth, because the moon's gravity is about 17 percent of Earth's gravity. So you weigh 17 percent less on the moon.

An element is a natural substance that cannot be broken down into any simpler ingredients. Scientists have discovered more than 100 elements in the universe.

Name the element found in each of the objects below, using the words in the box.

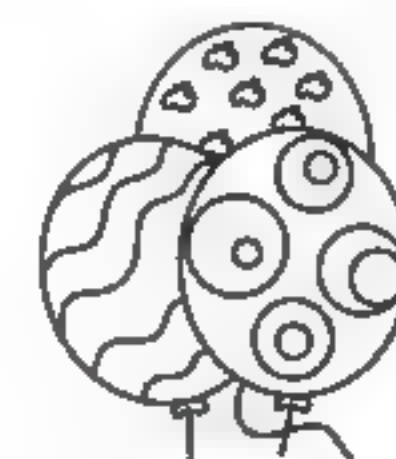
Aluminum Carbon Gold Helium
Iron Mercury Silver



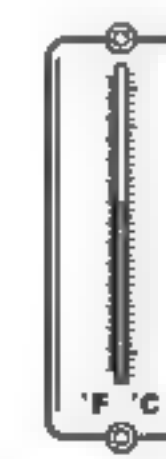
Carbon



Iron



Helium



Mercury



Silver



Aluminum



Gold

Scientists often refer to the elements by their chemical symbols. Together with your child download the Periodic Table of Elements from the internet. What elements are represented by these chemical symbols: O, H, C, N, Al? (Answer: oxygen, hydrogen, carbon, nitrogen, aluminum.) Fe stands for iron, Au for gold, and Ag for silver.

Energy is what makes things happen. Kinetic energy is the energy of movement. A speeding rocket contains kinetic energy. Potential energy is the energy that a still object has because of its position. A diver standing on a board has potential energy because of her height above the water. When the diver dives, her potential energy changes to kinetic energy.

Write **P** in the box next to each picture of potential energy and **K** in the box next to each picture of kinetic energy.



K



P



P



K



K



K

Energy is always changing from potential energy to kinetic energy and back again. At the top of a hill, a roller coaster car has lots of potential energy. As it speeds down the hill, it loses potential energy and gains kinetic energy. As it ascends the next hill, it loses kinetic energy and gains potential energy again. This cycle repeats throughout the ride.

Light enables us to see a bright and colorful world. Light travels in straight lines, called rays. Light bulbs and the sun are sources of light. They make light. Mirrors and many other objects reflect light. They do not make light.

Look at the pictures and put a check (✓) in the correct box, to indicate if it is a source of light or if it reflects light.



Source of Light Reflects Light

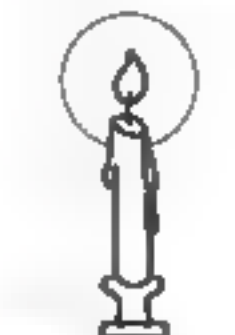
Safety strips

☐☒

Firefly

☒☐

Moon

☐☒

Candle

☒☐

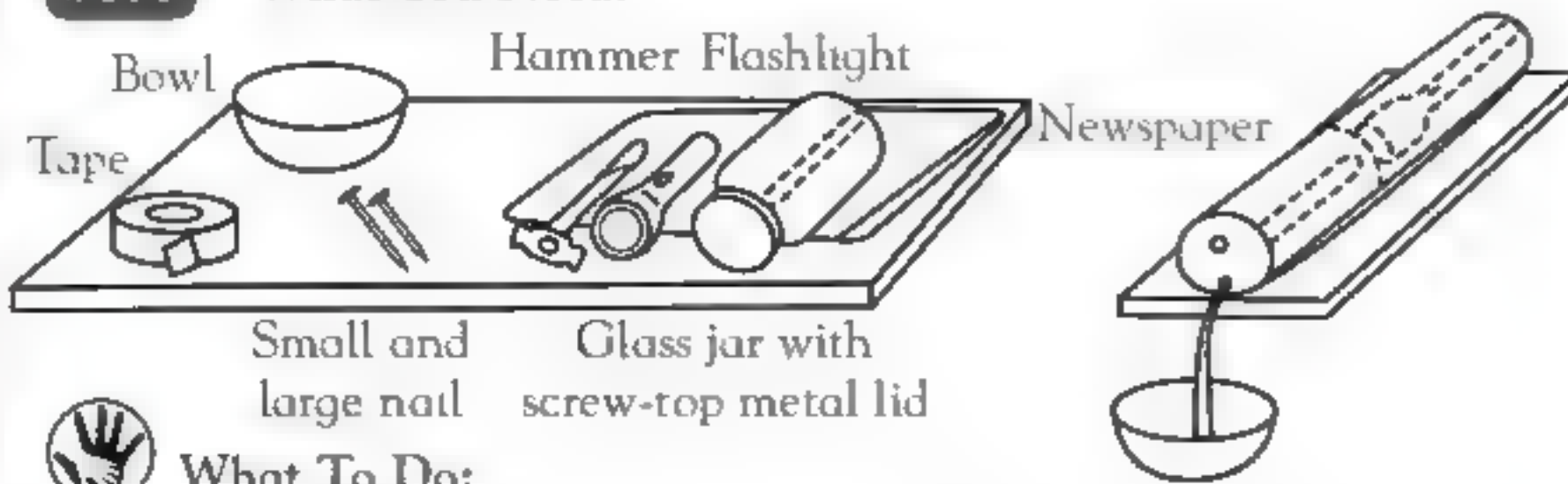
T.V.

☒☐

The brightness of light is an important part of how we see. In bright light we can see lots of detail and color. In dim light it is harder. Make your child read the same page from a book in four different degrees of brightness ranging from almost dark to very bright. Have them record on a chart the difference in the ability to read at each dimness level.

FACTS

When rays of light hit a smooth, shiny surface, they are reflected back. The flat surface of a mirror, for example, gives a perfect, clear image. Light also reflects off the surface of water.

TEST What You Need:**What To Do:**

1. Use the hammer and the nails to make a small hole in the lid of the jar near one edge, and a larger hole near the opposite edge. Ask an adult to help you.
2. Fill the jar with water, then screw the top back on tightly. Cover the holes with tape.
3. Lay the jar lengthwise at one end of the newspaper.
4. Turn on the flashlight. Position it at the bottom end of the

glass jar so that its light shines through the jar.

5. Roll up the jar and the flashlight (turned on) in the newspaper so that the newspaper forms a tube around them.

6. Turn off the room light so that it is dark. Remove the tape from the holes in the lid and watch the water pouring out of the jar into the bowl.

RESULT

What do you notice about the streams of water?

The light travels down the stream of water.

What do you think is happening?

The rays of light are reflected off the inside surface of the stream of water.

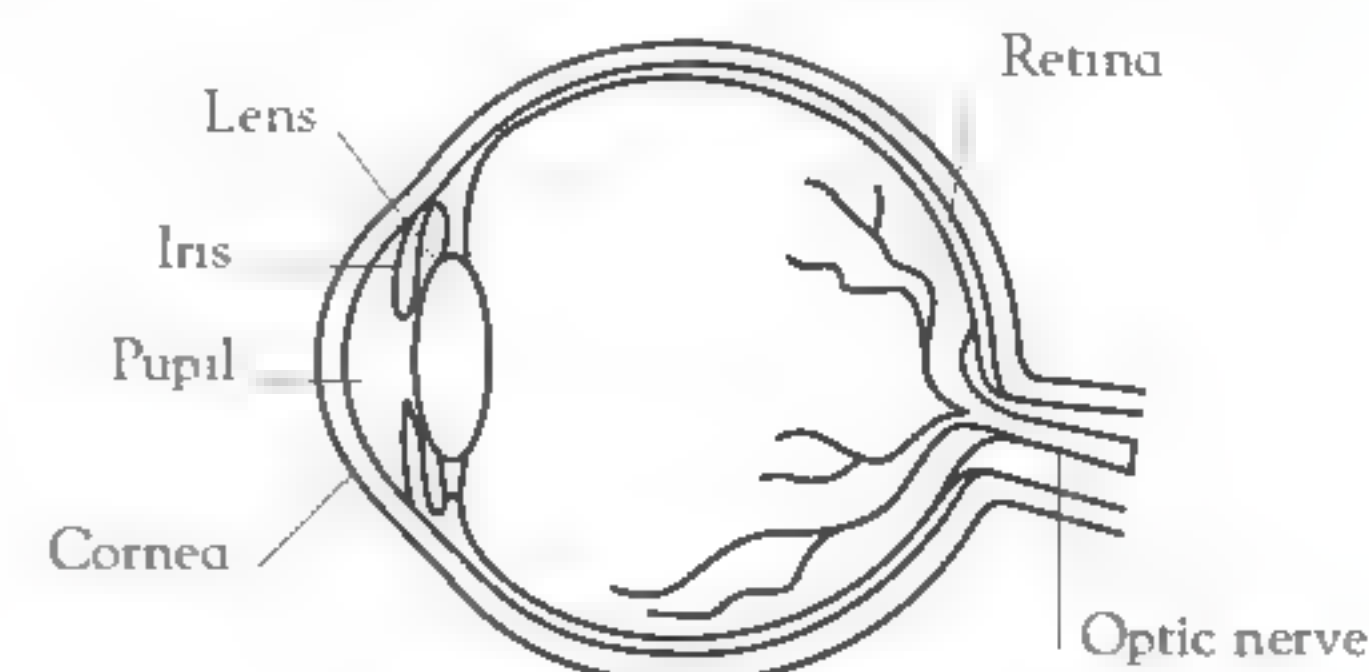
Now have your child set the flashlight (turned on) on the table in a darkened room. Have them pick an object in the room (a picture, chair, etc.), and have them try to aim the beam of light from the flashlight at that object using only a mirror. Can they do it?

FACTS

The eye has many parts. Light enters the eye through an opening called the pupil. The colored part around the pupil is called the iris. The cornea and lens work together to focus light onto the retina—a layer of light-sensitive cells at the back of the eye. The cells pick up the pattern of light and send signals to the brain along the optic nerve to form the image that we see.

Look at the picture and use the words in the box to complete the sentences.

Cornea Iris Lens Optic Nerve Pupil Retina



Cross-section of the eye

1. The cornea is a clear layer at the front of the eyeball.
2. The iris is a ring of colored tissue around the pupil.
3. The pupil is a hole that lets light into the eye.
4. The lens is a curved structure that bends light rays entering the eye.
5. The retina is a layer of cells at the back of the eye that detects light.
6. The optic nerve sends messages from the eye to the brain.

The retina is home to two specialized types of cells: rods and cones. Rods are sensitive to light, and allow us to see when it's dark, but not in color. Cones allow us to see color, but they need more light. Have your child try to identify colors while looking at something in a dark room. Then have them look at it with the lights on. Note the difference.

FACTS

Precipitation is water that falls through the atmosphere to the ground in the form of rain, snow, sleet, and hail.

The graph shows the average amount of precipitation that falls each month in a certain region. Use it to answer the questions.



1. Which month has the least precipitation? January
2. Which month has the most precipitation? August
3. Which month has 8 inches of precipitation? May
4. Which month has double the precipitation as March? July
5. Which month has half as much precipitation as May? November
6. What is the average precipitation for October, November, and December? 3 inches
7. Which months have the same amount of precipitation? February & June
8. Which season has the most precipitation? Summer

Precipitation takes many forms. How do snow, sleet, and hail differ? (Answer: Snow is falling ice crystals. Sleet is a mix of rain and snow. Hail is falling ice pellets.) What precipitation do you experience most where you live? Does that change with the seasons? Have your child chart the precipitation for one month (or more). Discuss their findings.

FACTS

Every part of the world has its own typical pattern of weather, or climate. An area's climate is affected by three main factors: its latitude (distance north or south of the equator), its height above sea level, and its distance from the sea. The climate of a region affects the kind of animals and plants that make their home there.

Look at the pictures of these four climate zones, and use the words in the box to complete the sentences.



Tropical regions are found near the equator, and are hot and wet all year round.

Polar climates are cold and dry, with long dark winters.

Deserts are dry regions, with less than 9 inches of rain a year, but can be hot or cold.

Temperate climates have warm summers and cool winters, with rain all year round.

Desert Equator Polar Rainfall Temperate

1. The climate of a region depends partly on how far it is from the equator.
2. A temperate climate has distinct seasons, with warm summers and cool winters.
3. A tropical climate is hot with high rainfall.
4. A polar climate is cold and dry.
5. A region of desert can be hot or cold, but is always very dry.

What climate do you live in? Have your child list the characteristics of that climate, including the weather, temperature, seasons, plants that grow, and animals that live in the area. How does that climate differ from other parts of the United States? The world?

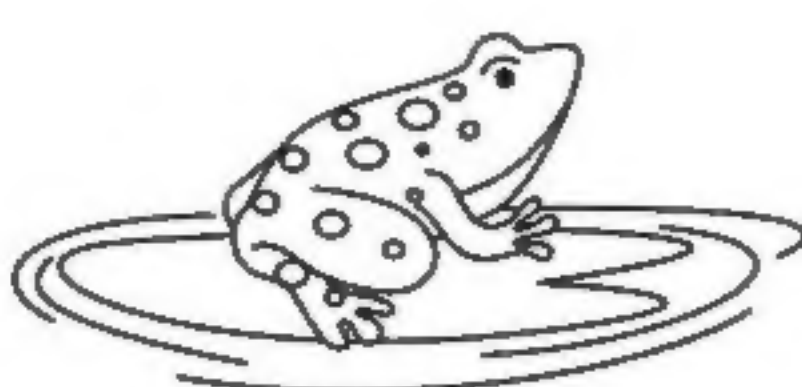
Animals come in many different shapes and sizes. Most animals live in one type of habitat because they are suited to it. We say they are adapted to the environment in which they live. For example, squirrels have sharp claws to grip and long tails to help them balance as they race up and down the trees.

Look at these pictures. Explain how each animal has adapted to its habitat.



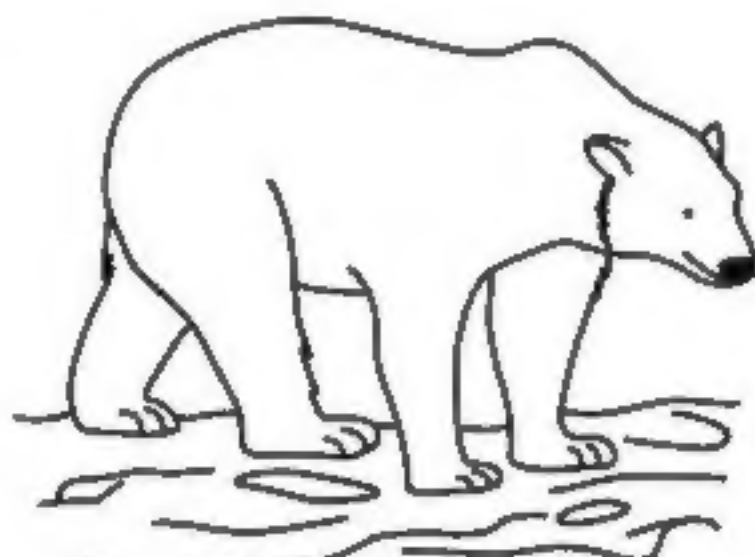
A mole burrows in dark underground tunnels.

Long claws help it to dig. It only needs tiny eyes because it lives in the dark.



A frog lives in ponds, among the weeds.

Webbed toes help it swim, and its green coloring helps it hide from predators among the weeds.



A polar bear lives in the snowy Arctic.

Long, thick, white fur keeps it warm, and hides it in the snow so it can creep up on prey.



An owl is nocturnal and lives in the trees.

Large eyes and good hearing help it hunt at night.

Ask your child how they think the following animals are adapted to their environments: shark (streamlined body, coloring, sense of smell), chameleon (camouflage ability, small “hands” that grip trees, long, sticky tongue to snatch prey), penguin (streamlined body for swimming, blubber for warmth, claws to grip the ice).

Every year, some animals make long journeys from one area to another, and then back again. This behavior is called migration. It is usually triggered by a change in the seasons or weather. The animals travel in search of food, or to find the best place to bring up their young.

Draw a line between each animal and the sentence that describes why it migrates.



Leatherback turtle



Monarch butterfly



Canada goose



Salmon



Caribou

These North American insects spend the winter in the warmer south and fly north in the spring in search of the plants they eat.

This fish lives most of its life at sea, but returns to fresh water to breed, swimming far up river.

This giant reptile travels the ocean, but once a year the female returns to the same tropical island to lay its eggs.

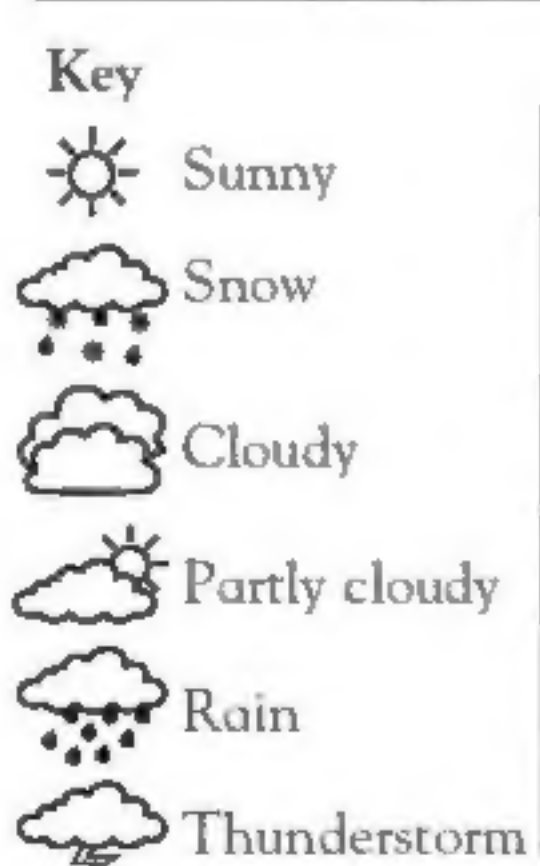
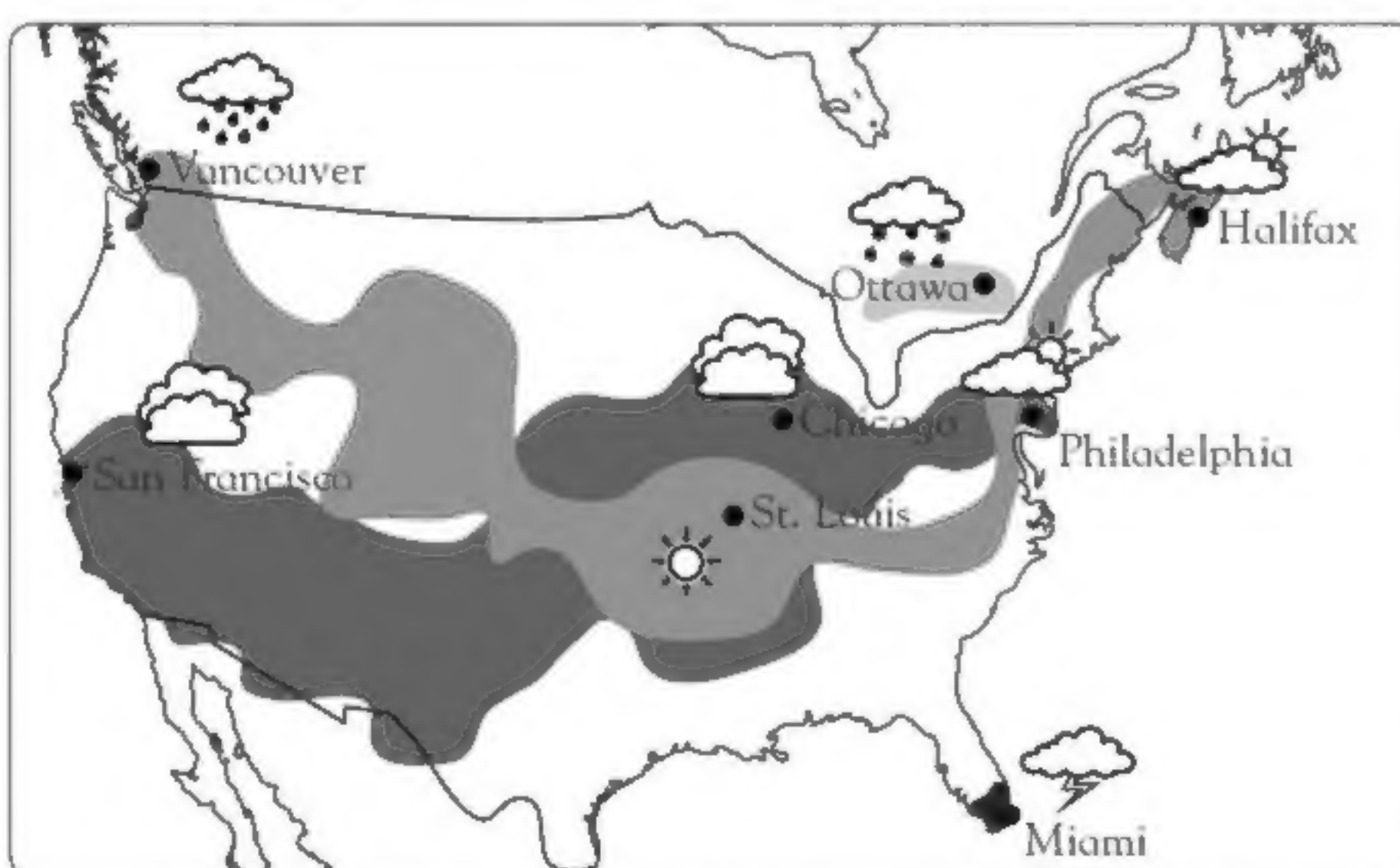
These mammals travel in large herds, making long journeys in search of food.

These birds breed around the Arctic Circle in summer, and fly south to warmer climates in the winter.

The longest migration of any animal in the world is made by the arctic tern, a small seabird. It travels a whopping 44,000 miles each year. The birds fly from Greenland to Antarctica every autumn, spending winter in Antarctica. They fly back to Greenland every spring.

A weather map shows the weather conditions over a large area at a certain time.

Study the map and the key and then describe the weather for each of the cities listed:



20°C
30°C
40°C
60°C

Chicago	40°C, cloudy
Halifax	30°C, partly cloudy
Miami	60°C, thunderstorm
Ottawa	20°C, snow
Philadelphia	40°C, partly cloudy
San Francisco	40°C, cloudy
St. Louis	30°C, sunny
Vancouver	30°C, rain

Weather maps are published daily in newspapers and online. Have your child check out a weather map each day for a week for the weather forecasts in your area. How accurate were the forecasts? Ask your child why they think that is.

Sometimes the weather becomes extreme. A hurricane is a huge spinning storm that forms over tropical oceans. A very strong and snowy winter storm is called a blizzard. A tornado is a swirling, funnel-shaped column of air over land that can be very destructive. A tornado over water is called a waterspout.

Read the descriptions below and circle the type of weather that is described.



- A towering column of violently swirling air that forms over land.
 - Breeze
 - Storm front
 - ☒ Tornado
- A storm with lots of snow, cold temperatures, and strong winds.
 - ☒ Blizzard
 - Gale
 - Hail storm
- A vivid flash of electricity created during a storm.
 - Electrocution
 - Lighting
 - ☒ Lightning
- A violent storm with strong winds and heavy rains that forms over tropical oceans.
 - Gale
 - Global wind
 - ☒ Hurricane
- The loud noise caused by lightning.
 - Blowback
 - Thunder
 - ☒ Whirlwind
- A towering column of spinning water that occurs over water.
 - Jet spray
 - Water cycle
 - ☒ Waterspout

This page talks about very large, specialized storms. Sometimes, however, a normal weather event can be extreme. Ask your child what they think those might be. Have they ever experienced one? (Possible answers: high, gusty winds on an otherwise clear day, torrential rainfall, thunderstorms that rattle windows, etc.)



FACTS

The swirling movement of air and debris in a tornado is called a vortex. You can see a vortex by making your own tornado in a bottle.

TEST What You Need:



What To Do:

1. Add a few drops of dishwashing liquid, a few drops of food coloring, and a couple of pinches of glitter to the bottle with water in it.
2. Turn the empty bottle over and attach the mouths of the two bottles securely together with the tape.
3. Turn the bottles upside down (so the bottle filled with water is on top). Move the bottles in a circular motion so that the water in the upper bottle starts to swirl.

RESULT

Describe what happens.

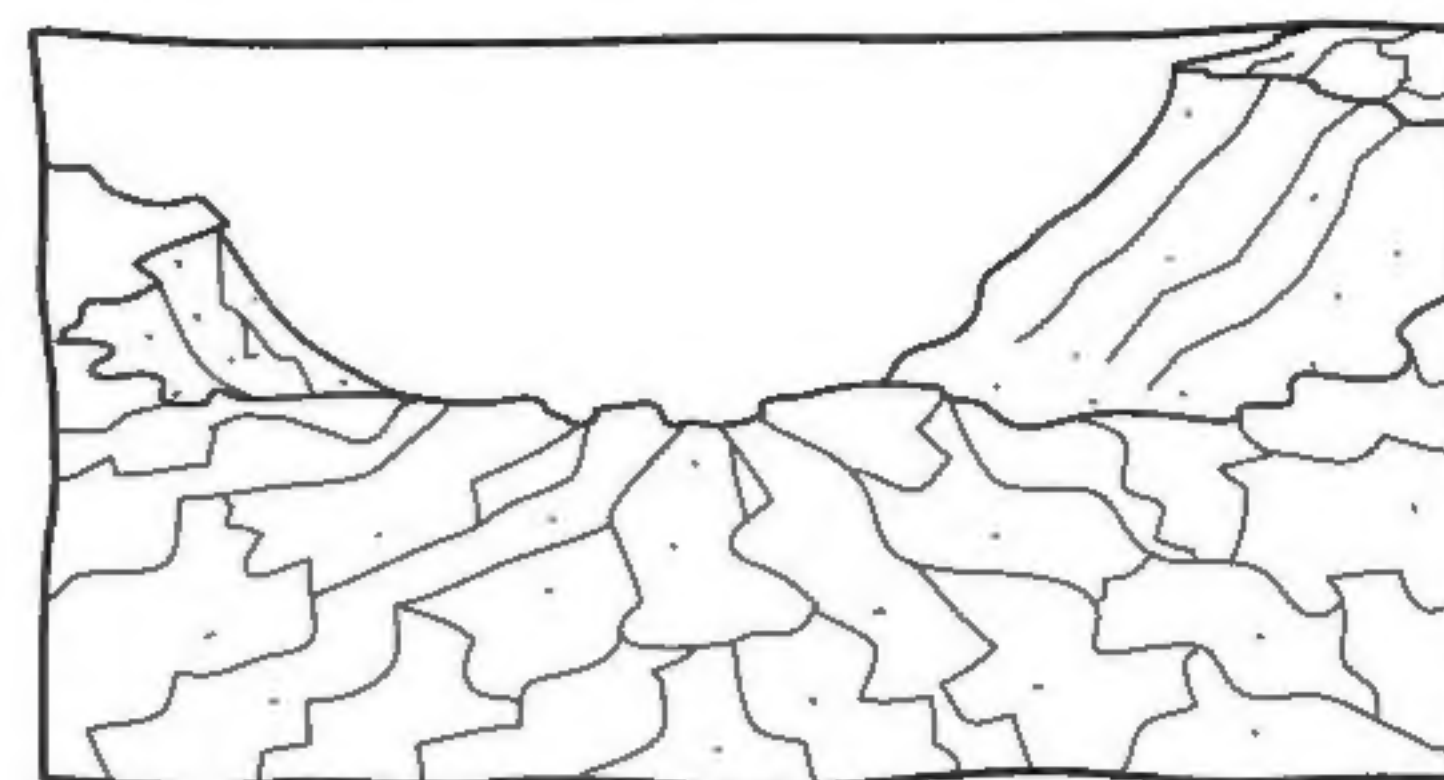
The water in the upper bottle forms a vortex and rapidly drains into the low bottle. This vortex is like a mini tornado.



FACTS

Weathering is the breaking down of large rocks into smaller and smaller rocks, until they become soil. This can happen by the action of wind or water or ice. Erosion is when rock or soil or sand gets washed (or blown) away over time by the movement of wind, running water, glaciers, or rain.

Read each sentence below and write **W** in the box if it is an example of weathering, or **E** if it is an example of erosion.



1. A flood washes soil from a farmer's land. ☐ E
2. Wind blasts sand at a rock, wearing away the rock. ☐ W
3. A glacier carries rocks down a mountainside. ☐ E
4. Wind blows sand across a desert. ☐ E
5. Rain carries mud down a hillside. ☐ E
6. Water seeps into a crack in a boulder and then freezes and breaks the rock apart. ☐ W



Sometimes this experiment is called “Hurricane in a Bottle.” That would also be correct, as a hurricane starts as a large, swirling mass of warm air. The faster it spins, the stronger the storm becomes. A vortex forms at the center of a hurricane.

Wind is a very powerful force in nature, and can help sculpt amazing formations in rock. Together with your child, search for images of Monument Valley, Grand Canyon, Badlands, and Paria Canyon. Discuss how you think the action of wind (carrying sand and rock particles) could create such amazing displays.

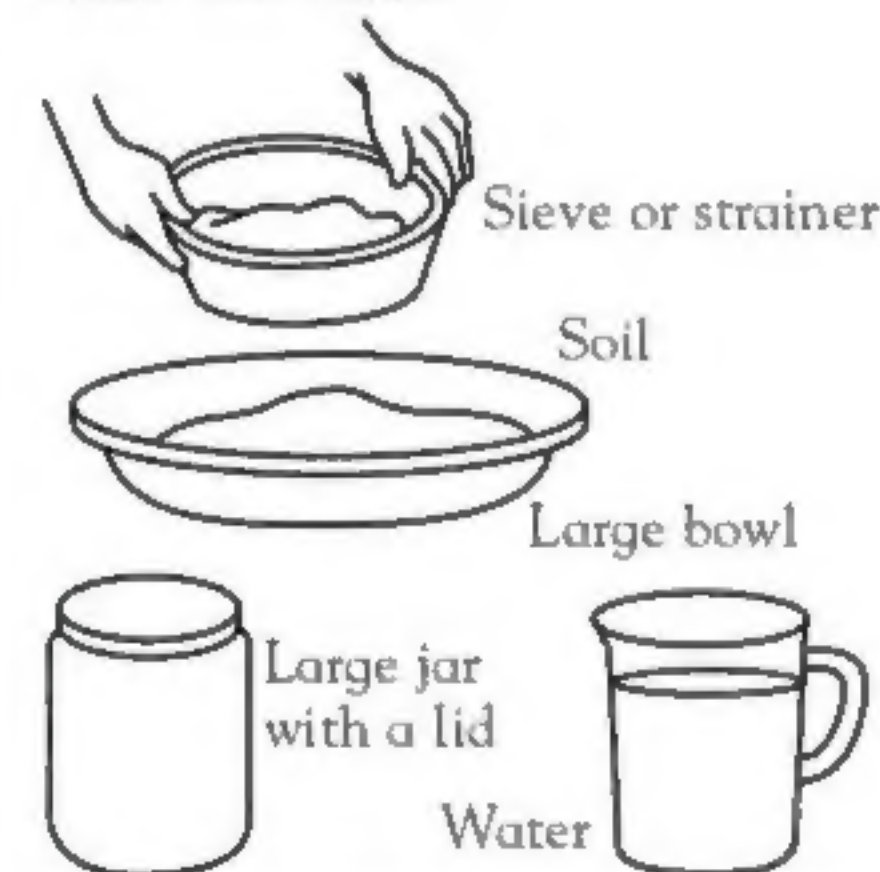


FACTS

The texture of soil depends on its mixture of sand, silt, and clay.

TEST

What You Need:



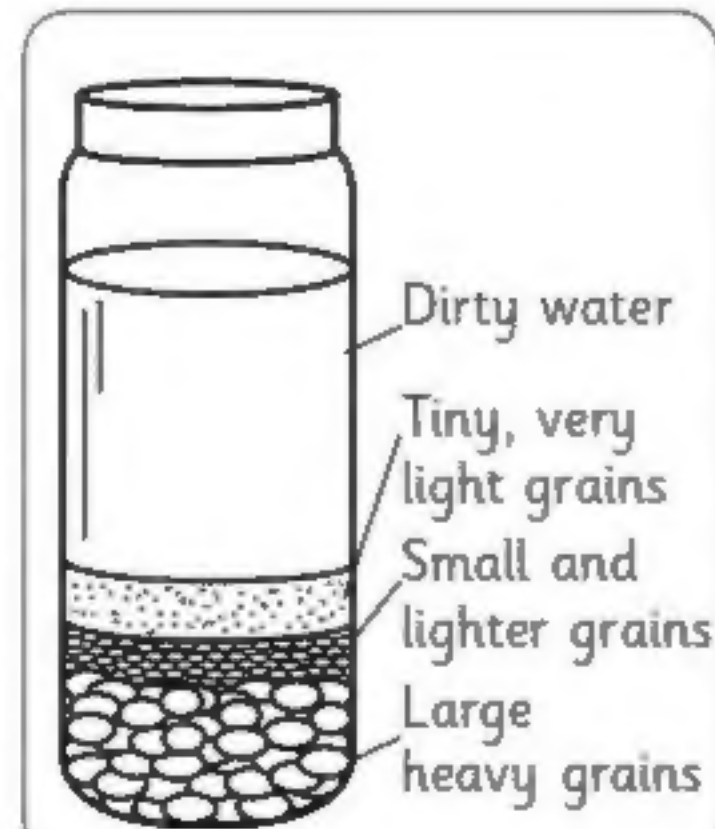
What To Do:

1. Pour the soil into the sieve and shake it over the bowl. The sieve will sift any pebbles and bits of debris from the soil.
2. Fill one-third of the jar with soil and add water.
3. Screw the lid on tightly and shake the soil-water mixture for 30 seconds.
4. Place the jar on a table and wait for a few days.

RESULT

Draw and label what appears in the jar. Explain what you can see.

Each layer is composed of grains of a certain type. Sand grains are on the bottom. Silt grains form the next layer. Clay grains settle on the silt. The layer of dirty water contains tiny bits of organic matter, called humus, that will not dissolve in water.



Soil is a product of weathering. It breaks down rocks into small bits. Those bits mix with decaying plant and animal matter (called humus) to become soil. After your child has separated the types of soil (sand, silt, and clay) in this activity, have them collect more. Then have them plant seeds in each soil type, and compare them as a growing medium.

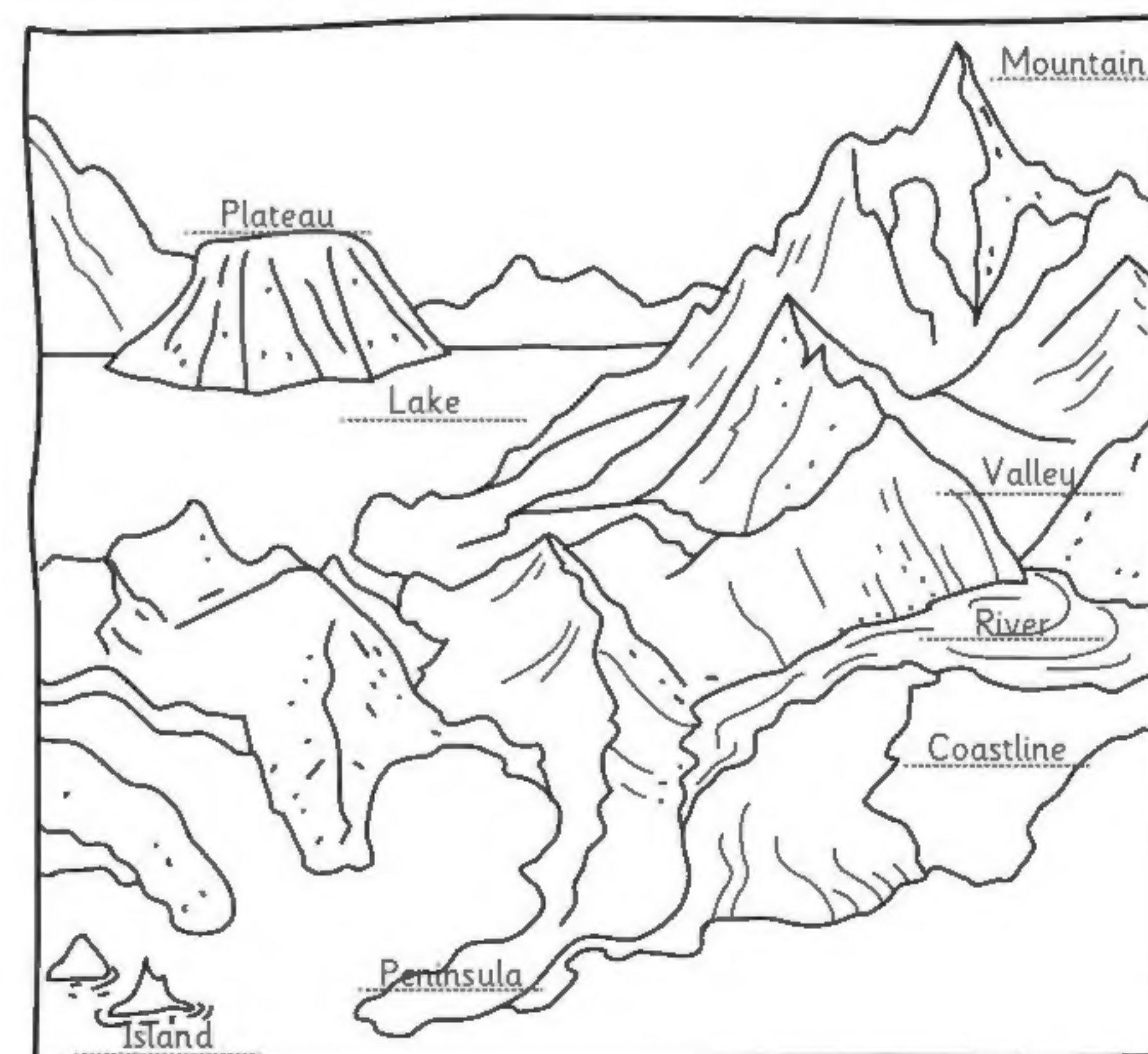


FACTS

The surface of the Earth has been shaped by many forces—the weather, volcanoes, earthquakes, ice, and water in rivers and oceans. The result is a varied landscape that includes high mountains, deep valleys, flat plains, and an ever-changing coastline.

Use the words in the box to name the features of the landscape in this picture.

Coastline Island Lake Mountain
Peninsula Plateau River Valley



Together with your child, use a map of North America and identify examples of each type of landform—coast, island, lake, peninsula, and so on. Have your child make a list of the features found naturally near where you live. What features are missing?

Packed with fun activities and exercises, these workbooks help keep children's science skills in top shape.

Through fact boxes, diagrams, experiments, and quick tests, children reinforce their understanding, build up their confidence, and reach their full potential in school.



Helps your child understand first science concepts. Specific topics covered include living things, the human body, healthy habits, the weather, the seasons, colors, water, and floating and sinking.



Reinforces early science learning. Children will become familiar with topics such as motion, light, and the properties of solids, liquids, and gases, as well as the basic needs of all animals and plants.



Supports your child's expanding science skills. Among the topics covered are animal movement, muscles, bones, the heart, teeth, fossils, speed, materials, rocks, the sun, and the moon.



Builds children's confidence in their growing scientific understanding. Objectives include familiarity with animal life cycles and adaptations, insect life, plant reproduction, simple machines, and states of matter.



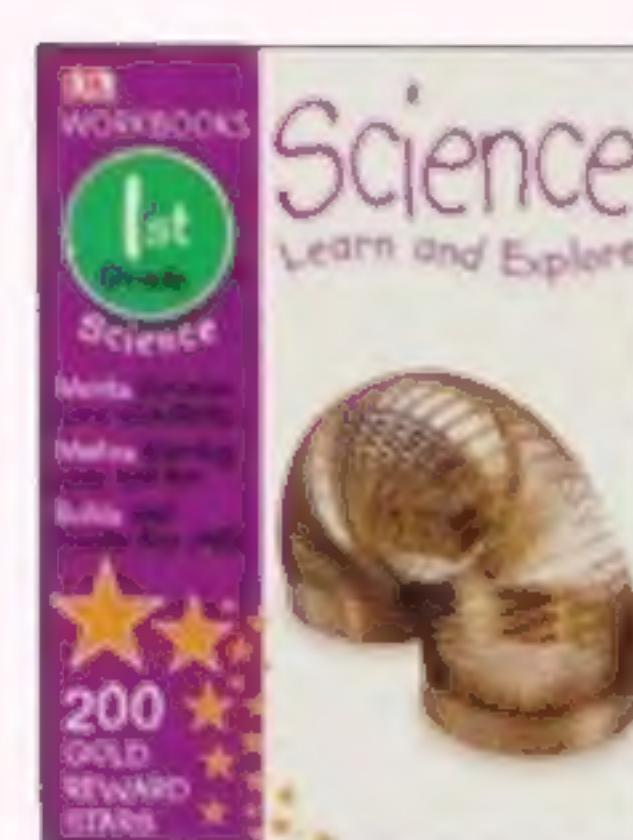
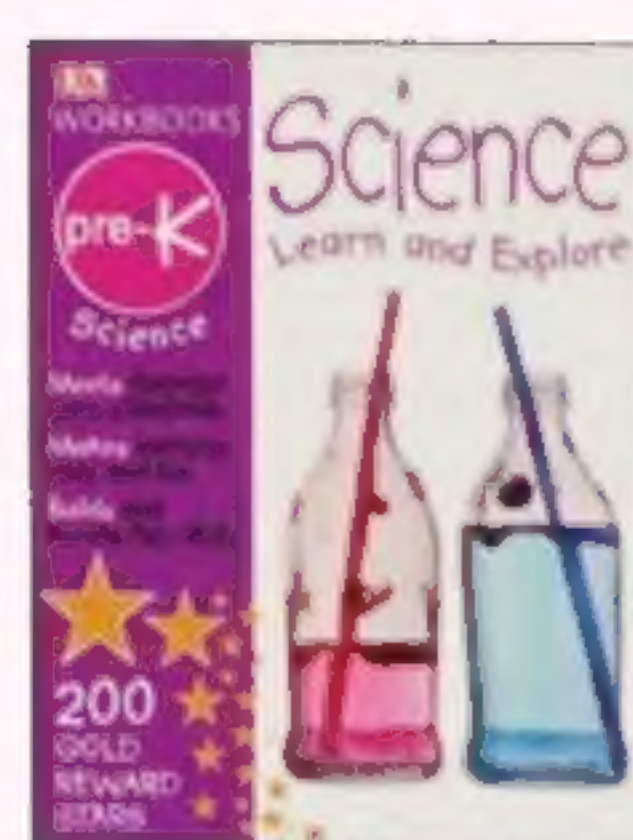
Provides extra practice to sharpen your child's science skills. Topics covered include basic anatomy, vertebrates and invertebrates, photosynthesis, the solar system, the elements, gravity, mass, and heat.

Practice is the key to improving your child's science skills.

Compiled by science experts and linked to school curricula, these innovative workbooks will help your child excel at school.

Parents' notes provide support, with answers and guidance, while a certificate boosts confidence by rewarding your child's achievements.

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